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LEAFLETS
OF
PHILIPPINE BOTANY

Edited by A. D. E. ELMER, A. M.

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LEAFLETS
ON
PHILIPPINE BOTANY

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LEAFLETS ON PHILIPPINE BOTANY

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Vol. I. Manila, P. I., April 8, 1906. Art. 1.

PHILIPPINE RUBIACEAE *

BY

A. D. E. ELMER.

——o——

AMARACARPUS BLM.

* Leaves lanceolate or oblanceolate, less than 6 cm. long.

1. **A. pubescens Blm.**

* * Leaves linear, longer than 6 cm.

2. **A. longifolius n. sp.** Shrub, 1 to 2 m. high; young branches short brown pubescent. Leaves opposite, rather numerous toward the ends of the twigs, linear, 12 cm. long, 8 mm. wide, gradually tapering toward the apex, base acute, midvein very prominent and brown pubescent beneath, submembranous, glabrous on both sides; lateral nerves obscure, about 16 pairs, submarginally united; petiole similarly pubescent, at most 5 mm. long; stipule thin, connate at the base, caducous, broadly ovate or oblong, 4 mm. long, ferruginous pubescent on the outer side. Inflorescence subsessily clustered in the terminal leafy axils; calyx pilose, its segments very short or obscure; corolla white, pilose on the exterior, companulate, tube about 2 mm. long, its 4 segments triangularly obtuse, villous at the

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* This article was prepared in the Bureau of Science, of the Philippine Government, Manila, P. I., and is here published with the consent of the director.

throat; stamens 4, inserted upon the corolla tube a trifle below the throat; filaments very short; anthers included, slightly longer than broad, less than 5 mm. long; style glabrous, gradually enlarging from the base to the apex, exceeding the throat; stigma with two short recurved arms; drupe upon 5 mm. long pedicels, yellowish red, obovoid, 8 mm. long, 6 mm. across at the top, 2-celled, 1-seeded; pyrenes abovoid, 5 mm. long, 4 mm. wide, sharply pointed at the base, its ventral surface flat or frequently concave, dorsal side convex and 4-ridged.

Type specimen 4000, E. D. Merrill, Atimonan, Province of Tayabas, Luzon, March, 1905.

ARGOSTEMMA WALL.

* Leaves scattering, lanceolate to oblanceolate, acute or acuminate at both ends.

1. A. solaniflora n. sp. Biennial herb, varying up to 16 cm. high; stems solitary or several, frequently branched, dirty white pubescent. Leaves opposite, scattered along the entire stem, the pairs unequal in size, membranous, broadly lanceolate or oblong, base acute, apex acuminate, subglabrous on the upper darker green surface, yellowish pubescent along the midnerve and on the 7 to 8 pairs of lateral nerves, the larger ones 7 cm. long and 2 cm. wide, usually upon slender 5 mm. long pubescent petioles; stipule 3 mm. long, oblong, obtuse at apex, membranous. Inflorescence usually terminal, equalling or exceeding the leaves, of a few flowered cyme; pedicels pubescent, subtended by bracts, about 8 mm. long; calyx cup shaped villous, its 5 segments acute; corolla white, rotate, united at the base; segments 5, ovate, slenderly acuminate, 7 mm. long, nerved, often strigose on the back especially along the margins toward the apex; stamens 5, erect, inserted upon the base of the corolla; filaments 2 mm. long; anthers 7 mm. long, bifid at apex, linear, introrse, upper portion without pollen; seeds small, numerous, in membranous sacs, smooth, brown when mature, flattened, 5 mm. across, irregular in shape; style barely exceeding the stamens; stigma entire subclavate.

Type specimen 6211, A. D. E. Elmer, Sablan, Province of Benguet, Luzon, April, 1904. It inhabits damp shady stream banks. The nodding buds and the flowers have a striking resemblance to some species of Solanum.

* * Leaves subverticellate, ovate to abovate or oblong, apex always obtuse or rounded.

+ Leaves subequal, equalling or exceeding the flowers.

2. A. wallichii Walp.

+ + Leaves very unequal, much exceeded by the flowers.

3. A. neesianum Walp.

ADINA SALISB.

1. A. multiflora Hav.

CHASALIA COMMS.

* Flowers sessile; corolla tube slender, usually curved.

1. C. curviflora Thw.

* * Flowers pedicellate; corolla tube short, straight.

2. C. rostrata Miq.

COFFEA LINN.

1. C. arabica Linn.

COELOSPERMUM BLM.

1. C. ahernianum n. sp. Evidently a scandent shrub, with smooth and frequently flattened branchlets. Leaves submembranous, opposite, 3 to 5 cm. apart, oblong to elliptic, smooth and glabrous on both sides, paler beneath, the larger ones 7 cm. wide, 19 cm. long including the 1 to 2 cm. long petiole, acute or obtuse at apex, base attenuate, midnerve prominent beneath and grooved on the upper side of the leaf, the 7 to 9 lateral pairs conspicuous and anastomosing; stipule short, obtuse, remaining as short and thick straw colored scales about the stem immediately above the leaf scars. Inflorescence terminal, shorter than the leaves, upon 3 cm. long primary peduncles, wholly glabrous, 1 to 3 umbellately branched into about 4 slender and unequal secondary peduncles; umbellets 13-flowered, ebracteate; flowers solitary upon 3 to 5 mm. long pedicels or in pairs upon a divided pedicel; calyx short, rim like or saucer shaped, irregularly and obscurely toothed, glabrous; corolla yellowish white, somewhat inflated, 6 mm. long including the segments, glabrous on the exterior, pubescent in the throat; segments 4, ovate to oblong, 2 mm. long, recurved, terminating to a rather fine puberulent apex; stamens 4, inserted upon the throat, alternate with the petals; filaments short, glabrous, adnate to the entire length of the tube; anthers 1.5 mm. long, linear, truncate at each end, basifixed; style 2 mm. long, glabrous, 2-cleft into flattened arms.

Type specimen 196, Forestry Bureau, collected by Ahern's collector, Dalupaon (Pasocao), Province of Camarines Sur, Luzon, January, 1902.

DENTELLA FORST.

1. D. repens Forst.

GALIUM LINN.

* Flowers yellowish; leaves ovate, finely ciliate.

1. G. ciliare Hook.

* * Flowers whitish; leaves linear lanceolate, glabrous.

2. G. gaudichaudi DC.

GEOPHILA DON.

* Leaves thin, less than 5 mm. across, usually root opposed.

1. G. (891* Whitford).

* * Leaves thicker, more than 5 mm. across, usually opposite.

2. G. reniformis Don.

GUETTARDA LINN.

1. G. speciosa Linn.

GARDENIA LINN.

* Fruit globose, its pericarp at least 5 mm. thick; scar at apex broadly circular and depressed.

1. G. whitfordii n. sp. Small slender trees, 7 to 10 m. high; branchlets smooth, yellowish white. Leaves chiefly at he ends of the twigs, opposite, 1 to 3 cm. apart, subcoriaceous, glabrous, oblong to narrowly elliptic or lanceolate to oblanceolate, apex acuminate or abruptly tapering to a caudate point, base obtuse or acute, with 5 to 7 pairs of rather obscure lateral nerves, 4 cm. wide, 12 cm. long including the glabrous 8 mm. long petiole; stipule coriaceous, 5 mm. long, sharply acuminate. Fruits usually solitary in the axils of the leaf scars, upon 5 mm. long bracteate peduncles, globose, 2.5 cm. in diameter, very hard, 1-celled or with a very obscure placenta like partition; pericarp leathery, 5 mm. thick; seeds 9 to 12 in each cell of the false divisions, irregularly compressed, circular in surface outline, about 5 mm. in diameter, dark brown, not pitted but with a felty appearance, closely imbricate and without pulpy tissue between them.

Type specimen 6643, A. D. E. Elmer, Mount Mariveles, Province of Bataan, Luzon, November, 1904. Common in the woods at 600 meters.

* * Fruit not strictly globose, with thinner pericarp; apex usually with an evident portion of the calyx.

+ Leaves pinnately nerved with 12 to 18 pair.

++ Corolla tube 5 to 7 cm. long; its segments membranous, about 3 cm. long.

2. G. barnesii Merr.

++ ++ Corolla tube shorter; segments subcoriaceous and smaller.

3. G. pseudopsidium (Blco.) F. Vil.

+ + Leaves with fewer nerves.

++ Flowers terminating the branches, solitary or in short 3 to 5 pedunculate cymes.

4. G. merrillii n. sp. Shrub 4 m. high or sometimes tree like; branchlets smooth, slender. Leaves opposite, usually 2 pairs in a subwhorl or often ternate, quite variable in size, the medium ones 6 cm. wide, 18 cm. long including the thick 5 mm. long petiole, elliptic to oblong or lanceolate to oblanceolate, shining green on the upper surface, paler beneath, acute or obtuse at apex, base acute or obtuse, half coriaceous, 7 to 9-nerved; stipule glabrous, leathery, acute, broad and subpersistent, enclosing a fringe of ferruginous hairs. Inflorescence of a very short 1 to 3-flowered cyme, upon a 1 cm. long peduncle, axillary or terminal, subtended by ciliate bracts; pedicels subsessile, bibracteate; calyx 8 mm. long, leathery, tubular or slightly turbinate, subglabrous without, densely pubescent within, minutely toothed; corolla tube subglabrous on the exterior, glabrous on the interior, pubescent on the throat, 5 cm. long, gradually expanding toward the apex; segments 5, the larger ones 4 cm. long, 1 cm. wide, oblong, obtuse or truncate at apex, thin, strongly nerved, rotate or reflexed, white, quite fragrant; stamens 5, included, sessily attached to the middle of the dorsal side; anthers 1 cm. long, linear; style also included, divided into 2 flattened arms; stigma 1 cm. long, 1.5 mm. wide; fruit subglobose or ovoid, 4 cm. in diameter, apex tapering to the short persistent calyx tube, 1-celled; pericarp thin; seeds embedded in 2 pulpy masses, about 20 in each, black, smooth, irregular, its sides roughly indented.

Type specimen of the flower 669, E. D. Merrill, Halsey, Culion, February, 1903; fruiting specimen 1226, Forestry Bureau, collected by R. Garcia, Lugin, Mindoro, January, 1903.

++ ++ Flowers axillary, solitary or in few flowered more slenderly pedunculate cymes.

= Apex of leaves obtuse or rounded.

5. G. elliptica n. sp. Shrubby, 4 to 6 m. high; twigs smooth, stout, compressed. Leaves opposite, subcoriaceous, glabrous, 5 to 7-nerved, elliptic to oblong, 6 cm. wide, 12 cm. long, with a very short and thick petiole, obtuse, rounded at the apex, base obtuse or acute; stipule coriaceous, glabrous, subpersistent, broad at the base, obtuse at apex. Inflorescence axillary, long pedunculate, solitary or in cymes of 3 to 5 flowers; pedicels and peduncles glabrous, with flattened ends; pedicels 1 to 2 cm. long, much shorter than the peduncles, subtended by 2 persistent bracts; calyx cup shaped, 5 mm. in diameter, glabrous, terminated by 5 short and truncate segments; corolla 1 cm. long, glabrous on the outer surface, densely woolly in the vicinity of the throat; segments 5, broadly obovate, 3 mm. long; stamens equal in number, inserted upon the throat; anthers linear, 5 mm. long, obtuse at apex, truncately sagittate at base; filaments very short, pubescent, attached to the middle dorsal portion of the anther; style equalling the corolla, glabrous at the base, the 2 cleft arms densely covered with woolly hairs; fruit leathery, ellipsoid, 15 mm. long, 10 mm. in diameter, crowned by the persistent calyx tube, 1-celled; pericarp about 2 mm. thick; seeds numerous, brown, flattened, with rounded edges, not pitted but surface finely striate, 2 mm. long, in shape like the achene of a buttercup, chiefly embedded on the inner surface of the pericarp.

Type specimen 705, H. N. Whitford, Atimonan, Province of Tayabas, Luzon, August to September, 1904.

= = Apex of leaves acute.

6. G. acutifolia n. sp. Small tree; twigs smooth, brown, usually compressed. Leaves distichous, opposite, 3 to 5 cm. apart, submembranous, glabrous on both sides, the upper ones much reduced, the larger ones 6 cm. wide, 16 cm. long including the very short petiole, the smaller one lanceolate and sessile, those of medium size ovate to elliptic ovate, base obtuse or rounded, apex abruptly acute or frequently obtuse, with 9 to 11 pairs of nerves; stipule 15 mm. long, connate at the base, oblong, obtuse or rounded at the apex, brown, submembranous, usually glabrous, its midnerve prominent toward the apex. Inflorescence axillary, solitary or in few flowered cymes; pedicels and peduncles glabrous, flattened, usually curved and bibracteate; pedicels of fruit about 15 mm. long, the peduncles more than twice that in length; calyx glabrous, 10 mm. long, divided into 5 segments which are finely ciliate on the edges, oblong or oblanceolate, exceeding the corolla; segments of corolla twisted and imbricate in bud, ovate to elliptic, 5, united only at the base, throat sparsely hairy; stamens 5, inserted upon the short corolla tube near the base; filaments short, attached to the middle dorsal side of the 2 mm. long anther; fruit leathery, ellipsoid, 15 mm. in diameter, 2 cm. long, with a short persistent calyx tube, 1-celled; pericarp 1.5 mm. thick; seeds numerous, flattened, smooth and with rounded edges, 2 cm. across, finely striate, similar to the seeds of a buttercup.

Type specimen of the flower 437, E. B. Copeland, Davao Province of Davao, Mindanao, March, 1904; fruiting specimen 457, Forestry Bureau, collected by J. F. Quadras, Dinagat, February, 1901. This may be only a form of the preceding species.

HYDNOPHYTUM JACK.

* Leaves elliptic or obovate; medium and lateral nerves evident.

1. H. formicarium Jack.

* * Leaves lanceolate or oblanceolate; medium and lateral nerves obscure.

2. H. philippinensis Becc.

HYMENODICTYON WALL.

1. H. excelsum Well.

HYPOBATHRUM BLM.

* Leaves oblong or elliptic, acute or obtuse.

1. H. frutescens Blm.

* * Leaves lanceolate, acuminate.

+– Foliage glabrous.

2. H. parviflorum Miq.

+ + Foliage pubescent beneath.

3. H. glomeratum (Bartl.) Sch.

IXORA LINN.

* Lobes of calyx equalling or longer than its tube.

I. G. kingstonia Hook.

* * Lobes of calyx shorter than its tube.

+ Leaves sessile, triangularly acuminate.

2. I sparsiflora n. sp. Lax shrubs, 3 m. high; branches smooth, frequently dichotemously branched. Leaves sessile, distichous or nearly so, about 5 cm. apart, submembranous, wholly glabrous, triangularly acuminate, 8 cm. long, 3 cm. wide at the base, sharply pointed at apex, base subemarginate, pinnately nerved with 15 to 18 pairs; stipule coriaceous, persistent, 8 mm. long, broad at the base, abruptly tapering to a slender bristle like awn. Infrutescence terminal, corymbosely paniculate; the primary peduncles subtended by 2 thin linear foliaceous bracts, the secondary peduncles and pedicels subtended by a pair of short setaceous bracts; pedicels 1 cm. in length, glabrous, straight, persistent, bibracteate at the apex and immediately beneath the fruit; mature and perfect fruit subglobose, subdidymous, 8 mm. across the widest portion, 6 mm. long, smooth, with 4 minute and persistent calyx segments.

Type specimen 6641, A. D. E. Elmer, Mount Mariveles, Province of Bataan, Luzon, November, 1904.

+ + Leaves linear, about 1.5 cm. wide, 20 cm, long.

3. I. salicifolia Blm.

++ Inflorescence on slender hangimg peduncles, axillary or terminal.

4. I. cumingiana Vid.

++ ++ Inflorescence subsessile or pedunculate, always terminal.

= Infrutescence subsessile, usually only 1-flowered between large foliaceous bracts.

5. I. bibracteata n. sp. Shrub with rigid and gnarly branches. Leaves chiefly at the ends, lanceolate or oblanceolate, membranous, glabrous on both sides, reddish brown beneath when cured, darker brown above, subsessile, 9 cm. long, 2.5 cm. wide, apex abruptly acute, base attenuate, opposite, the uppermost pair much smaller and bract like, midnerve prominent, the 9 to 12 lateral pairs obscure; stipule cupular, coriaceous, abruptly tapering to a fine point. Fruits usually solitary, subsessile at the ends of the leafy branchlets; pedicels very short, subtended by 2 large foliaceous bracts and a series of small scale like ones: fruit smooth, subglobose or somewhat compressed, 1 cm. in diameter, 2-celled, bearing a persistent rim like calyx with 4 acute teeth; seed circular, centrally attached, concave on the ventral side, convex on the dorsal, 1 in each cell.

Type specimen 779, H. N. Whitford, Tinnan River, Province of Tayabas, Luzon, September, 1904.

= = Infrutescence congested, upon short rigid peduncles.

ℨ Leaf base rounded or subcordate.

6. I. coccinea Linn.

ℨ ℨ Leaf bases attenuate.

∞ Corolla segments broadly elliptic or subrotund.

7. I. stricta Linn.

∞ ∞ Corolla segments oblong.

8. I. amboinica (Blm.) DC.

= = = Infrutescence paniculately spreading, upon elongated peduncles.

ℨ Tube of corolla 1 cm. long.

9. I. barbata Roxb.

ℨ ℨ Tube of corolla exceeding 3 cm. in length.

∞ ∞ Leaves usually oblanceolate, subcoriaceous, about 12 cm. long.

10. I. fulgens Roxb.

∞ ∞ Leaves usually lanceolate, membranous, exceeding 12 cm. in length.

11. I. lobbii Lond.

KNOXIA LINN.

1. K. corymbosa Willd.

LASIANTHUS JACK.

* Glomeruli covered by the persistent and coriaceous stipules.

1. **L. stipularis Blm.**

* * Glomeruli not covered by the more or less deciduous stipules.

+ Bracts broad.

2. **L. inaequalis Blm.**

+ + Bracts linear.

++ Leaves hispidly papillose on both sides.

3. **L. hispidus n. sp.** A shrub, 2 m. high, with twigs short but densely hispid. Larger leaves 5 cm. long including the 4 mm. long petiole, distichous, 2.5 cm. apart, nearly 2 cm. wide, narrowly ovate or broadly lanceolate, both sides hispidly papillose , very rough especially on the upper surface, apex acute, base rounded or obtuse, rather dry and coriaceous, the margins usually recurved, midvein prominent, lateral ones very obscure; stipule small, hispid, with short lacinae. Flowers in axillary glomerules, about 7 to 12-flowered, subtend by comparatively few ciliate bracts; drupe hispid, globose, crowned by 4 linear acuminate segments, 1.5 mm. in diameter, 4-celled, each cell containing about 4 rectangularly angled seeds, brownish black when mature.

Type specimen 767, E. D. Merrill, Ewiig River, Province of Paragua, Paragua, February, 1903.

++ ++ Leaves pubescent on both sides.

4. **L. copelandi n, sp.** Shrubby, 2 m. high; its branches covered with a dense velvety pubescence of grayish or yellow hairs. Leaves opposite, distichous, about 3 cm. apart, short petiolate, 7 to 10 cm. long, 2 to 3 cm. wide, membranous, oblong or oblanceolate oblong, apex acuminate, base truncate and unequally subcordate, the lower half longer and usually broader, equally pubescent on both sides but especially along the 7 to 9 pair of nerves beneath; stipule 7 mm. long, laciniate, ciliate pubescent. Flowers axillary, sessile, solitary or sometimes as many as 3 in an axil, minute, subtended by a few laciniate bracts which are similar and equal in length to the stipules; drupe pubescent, 5 mm. in diameter, crowned by the 4 persistent calyx segments, subglobose or more tapering to the base;

pyrenes 4 or 5, triquetrous, obovoid, 5 mm. long, apex rounded, gradually tapering to a pointed base, attached to the middle of the ventral edge.

Type specimen collected by E. B. Copeland, Gimogon River, Negros, January, 1905. In the forests.

++ ++ ++ Leaves glabrous on the upper surface.

= Base of leaf rounded, subcordate, oblique.

5. L. bordeni n. sp. Shrubs, about 2 m. high, with pubescent twigs. Leaves distichous, opposite, 2 or more cm. apart, short but densely pubescent, petioled or subsessile, 4 to 6 cm. long, 2 to 3 cm. wide, oblong or narrowly elliptic, acute or obtuse at the apex, base truncate and unequally cordate, the lower half longer and broader, subcoriaceous, glabrous above, beneath prominently 6 to 8-nerved, the whole under side strigose with olivaceous hairs especially along the nerves; stipule laciniately divided into 5 to 8 unequal segments, densely covered with greenish yellow hairs. Flowers sessile, minuete, 1 to 3 in the leaf axil, completely surrounded and covered by laciniate yellowish bracts; drupe light blue, fetid, subglobose, nearly 5 mm. in diameter, puberulous, crowned by the extremely short calyx teeth; pyrene 4, triquetrous, 2 mm. long, 1 mm. wide on each side, its apex rounded, the base more pointed, attached at the base on the ventral edge.

Type specimen 6997, A. D. E. Elmer, Mount Mariveles, Province of Bataan, Luzon, November, 1904.

= = Base of leaf attenuate.

6. L. lucidus Blm.

++ ++ ++ ++ Leaves glabrous on both sides.

ℸ Mature drupes blue; foliage membranous with reticulations plainly evident.

7. L. laevigatus Blm.

ℸ ℸ Mature drupes yellow; foliage not membranous with reticlations not evident.

8. L. culionensis n. sp. Slender tree, 7 m. high; stem 7 to 12 cm. in diameter. Leaves leathery, opposite, glabrous, equally acuminate at both ends, 7 to 10 cm. long including the 1 cm. long petiole, 2 to 3 cm. wide across the middle, obscurely 3 to 4-nerved; stipule short, entire, obtuse, coriaceous. Fruits chiefly in the axils of the leaf scars, 1 to 3-clustered, upon 4 mm. long glabrous pedicels; drupe 8 mm. in diameter, apex flattened or truncate, glabrous, yellow, 4 or 5 costate on the outside; pyrenes 4 or 5, frequently very unequal, 5 mm. long, obtuse at each end, more or less compressed and rugose.

Type specimen 615, E. D. Merrill, Halsey, Culion, December, 1902. In dry forests.

MITRAGYNE KORTH.

* Fruit strongly ridged.

1. **M. speciosa Korth.**

* * Fruit obscurely costate.

2. **M. diversifolia (Wall.) Hook.**

MORINDA LINN.

* Scandent shrubs.

1. **M. microcephala Bartl.**

* * Erect shrubs.

2. **M. citrifolia Linn.**

MUSSAENDA LINN.

* Calyx segments short, acute, persistent.

1. **M. grandifolia n. sp.** A shrub, 3 to 4 m. high; younger branches, leaf petiole and inflorescence densely ferruginous pubescent. Leaves membranous, the larger ones 10 to 15 cm. wide, 25 to 35 cm. long including the 2 to 3 cm. long petiole, ovate or oblong to oblanceolate, apex acute, base long attenuate or abruptly cuneate, short pubescent on both sides but especially beneath on the 11 to 14 pairs of nerves; stipule slenderly acuminate, densely covered with brown hairs. Panicle terminal, shorter than the leaves; branches divaricate, straight, rather strong and thick, ternately forked, subtended by short acute bracts; terminal flower sessile, those on the lateral

branches 1 to 3 clustered and subsessile; calyx 7 mm. long, elongated, densely covered with yellowish brown hairs, its 5 persistent segments acute or acuminate, glabrous on the inner surface, 1.5 mm. long or frequently one of them developed into a conspicuous ovate yellowish white bract; corolla yellow, 3 cm. long, tubular, broadest across the top, exterior pubescent, lanose on the interior; its 5 segments broadly ovate, apex abruptly terminated by a short acumen, puberulous on the upper surface strigose, below, rotate, 4 mm. in length; stamens inserted upon the tube; the baccate fruit crowned by the persistent calyx teeth, 2-celled, 1 cm. long, 6 mm. in diameter, pubescent; seeds very numerous, embedded in a pulpy mass, cubical, 5 mm. in diameter, pitted.

Type specimen 817, E. D. Merrill, Point Separation, Province of Paragua, Paragua, February, 1903.

* * Calyx segments linear, acuminate, not persistent.

+ Leaves and young branches subglabrous.

2. M. grandiflora (Mey.) Rolfe.

+ Leaves and young branches hirsute pilose.

++ Leaves elliptic, broadly ovate or oblanceolate, longer than 10 cm.

3. M. anisophylla Vid.

++ ++ Leaves oblong or ovate acuminate, the larger ones not exceeding 10 cm. in length.

4. M. benguetensis n. sp. A lax shrub, 2 to 4 m. high. Leaves mainly clustered toward the ends of the densely ferruginous pubescent twigs, easily falling, 6 to 10 cm. long including the 6 mm. long pubescent petiole, 2.5 to 4 cm. wide, ovate or oblong, acute or acuminate, base rounded or abruptly cuneate, the 8 to 10 pairs of ascending nerves prominent beneath, adpressed strigose on both sides but especially dense beneath; stipule subpersistent, pubescent on the outside, nearly glabrous on the inner face, brown, subcoriaceous, 8 mm. long, the broad base gradually tapering into 2 sharply acuminate teeth. Inflorescence terminal, barely exceeding the foliage, subcorymbose; branches erect, brown pubescent, bearing a loose cluster of 3 to 5 flowers, subtended by large brown bracts; calyx densely yellowish pubescent, 14 mm. long including the 5 mm. long sharply acuminate segments; one of these is often enlarged to a nearly white, ovate, acuminate, persistent bract; corolla tubular, 4 cm. long including the 5 segments, exterior pubescent, glabrous on the interior below the middle, yellow; segments thick, quite broad, obtuse, pubescent on the lower side, felty on the upper; stamens 5, attached a trifle above the middle of the corolla tube; anthers linear, 5 mm. long; filaments very short; style glabrous, bearing 2 elongated and subcompressed stigmatic arms; fruit fleshy, dark brown, 2 cm. long or longer, 1 cm. in diameter, equally tapering at both ends, densely set with warty excrescencies, 2-celled; seeds very numerous, embedded in a pulpy tissue, suborbicularly flattened, light brown, very short pubescent, pitted.

Type specimen 5935 A. D. E. Elmer, Baguio, Province of Benguet, Luzon, March, 1904. The flowers are sweetly fragrant, and the mature fruits have the odor and taste of raisins.

MUSSAENDOPSIS BAILL.

1. M. multiflora n. sp. Shrub or possibly a small tree; its ultimate branches glabrous or finely yellowish pubescent, subcompressed. Leaves opposite, glabrous, membranous, darker green on the upper surface, obovate or oblanceolate, the larger ones 35 cm. long and 15 cm. across, with a petiole 1 or 2 cm. long, apex short acute, base long attenuate, with 9 to 12 pairs of nerves; stipule 1 cm. long, glabrous, brown, acuminate. Inflorescence terminal or from the uppermost axils, long pedunculate, forming a broadly rounded panicle, almost 40 cm. wide and nearly that in length; its main branches short yellowish pubescent, compressed, usually in pairs, divaricate; flowers not seen; capsules short pubescent, secundly disposed, upon 1 mm. long pedicels, 4 mm. long, subterete, 2 mm. in diameter, 2-celled, septicidally dehiscing usually from the base, crowned by the 5 persistent erect broadly rounded calyx segments; seeds numerous, minute, flattened, submembranously winged.

Type specimen 490, Forestry Bureau, collected by J. F Quadras, Island of Dinagat, March to May, 1901.

MYRMECOIDEA JACK.

1. **M. echinata Gaud.**

NERTERA BANKS.

* Leaves thin, glabrous.

1. **N. depressa Banks.**

* * Leaves thicker, pubescent.

2. **N. dentata n. sp.** An herbaceous prostrate creeper, taking root from the nodes; stems filiform, slender, branched, its central fibers very strong. Leaves subsessile or upon 1 mm. long petioles, 8 mm. long, nearly that in width across the base, broadly ovate, coarsely and crenately dentate, paler beneath, strigose on both sides, opposite; stipules obsolete and represented by ciliate bristles. Flowers solitary upon 1 mm. long pedicels, axillary; calyx persistent, united at the base, finely cinereous on the inside; its 5 segments subcoriaceous, long acuminate or spinescent, 2 to 3 mm. long, strigose on the outer side but soon becoming glabrous; flowers not found; mature berries shining, vermillion red, 2 mm. in diameter, globose, frequently with a short persistent style, dehiscing from the apex into 4 quadrate coriaceous carpels, its interior 1-celled and bearing a thick central placenta; seeds many, compressed lenticular, 0.25 mm. in length, smooth, shining brown.

Type specimen 6239, A. D. E. Elmer, Mount Santo Tomas, Province of Benguet, Luzon, May, 1904. It forms dense mats in clay-like soil at 2650 meters.

NAUCLEA LINN.

* Upper portion of petiole and leaf nerves beneath pubescent.

+ Leaves oblanceolate, and nerves beneath strigose.

1. **N. strigosa Korth.**

+ + Leaves otherwise, nerves short pubescent.

++ Leaves oblong, distinctly cordate at base.

2. N. cumingiana Vid.

++ ++ Leaves lanceolate, attenuate at base or unequally rounded.

3. N. bartlingii DC.

++ ++ ++ Leaves orbicular, subcordate at base.

4. N. reticulata Hav.

* * Petiole and leaf nerves beneath glabrous.

-+- Leaves 4-nerved, apex caudate.

5. N. philippinenses (Vid.) Hav.

-+- -+- Leaves more numerously nerved, not caudate.

++ Foliage longer than 18 cm. and wider than 8 cm.

= Leaves elliptic obovate, acute or obtuse at base, 9 to 11-nerved; linear calyx segments subpersistent.

6. N. media Hav.

= = Leaves ovate, elliptic to oblong, obtuse or rounded at base 8 to 10-nerved; trunate calyx segments caducous.

7. N. purpurascens Korth.

++ ++ Foliage smaller in size.

8. N. vidalii n. sp. Tree, 8 m. high, with a trunk 4 dm. in diameter; bark coarsely and deeply checked; branchlets thick, glabrous, brown, dotted with small elliptic lenticels. Leaves opposite, 4 cm. apart, glabrous on both sides, coriaceous, oblong to obovate, about 12 cm. long including the thick 5 mm. long petiole, 5 cm. wide, obtusely rounded at apex, base subauriculate or truncately rounded, the brown nerves prominent beneath, with 7 to 9 lateral pairs. Infrutescence upon stout rigid peduncles, ternate or ternately compound; heads upon short articulate stalks, globose, 25 mm. in diameter; the subpersistent truncate calyx yellowish pubescent; fruit about 8 mm. long, brown and glabrous on the sides, angular, gradually tapering from the base, dehiscing laterally, 2-celled; seeds numerous, imbricate, yellowish brown, glabrous, lenticular, its testa extended from each end into hyaline wings.

Type specimen 6138 A. D. E. Elmer, Sablan, Province of Benguet, Luzon, April, 1904.

OLDENLANDIA LINN.

(Hedyotis Linn.)

* Ligneous (Hedyotis).

+ Flowers sessile in small heads.

1. O. prainiana (King) Elm.

+ + Inflorescence lax, paniculate, much exceeding the leaves.

2. O. apoensis n. sp. A diffuse shrub, 1 to 2 m. high; upper stems and branches glabrous, smooth and shining. Leaves including the 1 cm. long petiole, 7 to 12 cm. long, 1.5 to 3 cm. wide, lanceolate, slenderly acuminate, base acute, membranous, glabrous on both sides, nerves 5 to 7 pairs, chiefly from the midrib below the middle and parallel to it; stipules glabrous, united at the broad base, 1 cm. long including the numerous laciniate shreds which at least in the younger ones bear elongated glandular tips. Inflorescence lax and axillary, slenderly paniculate, much exceeding the leaves; its main peduncles subtended by foliaceous bracts, the ultimate ones 3-flowered and subtended by setaceous bracts; pedicels at least 1 cm. long, glabrous; calyx turbinate, smoothly glabrous, 4 mm. long including the erect acute 1.5 mm. long segments; corolla campanulate, 7 mm. long, glabrous on the outside as well at on the inside, half divided into 4 triangularly obtuse segments which are densely pilose on the entire ventral surface; stamens 4, inserted upon the corolla 1 mm. below the throat and alternating with the segments; filaments short, flattened; anthers 2 mm. long, pointed toward the apex, sagittate at base, dorsifixed; style glabrous, exerted, subpersistent, with a small terminal stigma; ovary 2-celled, septicidally dehiscing; seeds numerous, black, angular, obscurely pitted.

Type specimen 1131, E. B. Copeland, Mount Apo, Province of Davao, Mindanao, April, 1904. Sprawling and woody at the base, near the 2000 meter camp.

+ + + Inflorescence corymbose or subumbellate, the cluster somewhat congested, not exceeding the leaves.

++ Stipules of numerous long filiform segments.

3. O. yoderi n. sp. Apparently a low shrub, with ultimate branches smoothly glabrous and fluted. Leaves opposite, glabrous, linear, oblong or lanceolate, 7 to 10 cm. long including the 1 cm. long glabrous petiole, 1.5 to 2.5 cm. wide, subcoriaceous, apex acuminate, base attenuate, obscurely 5 to 7-nerved; stipules glabrous, broad at base, divided into many slender glabrous laciniate shreds. Inflorescence slenderly pedunculate, glabrous, cymosely umbellate, not exceeding the leaves, axillary or subterminal, more or less congested; branchlets subtended by glandular tipped stipules and foliaceous bracts; flowers usually in clusters of 1 to 3, subsessile; calyx glabrous, 2 mm. long; its 4 segments persistent, roundly obtuse, 0.5 mm. long; corolla 4 mm. long, glabrous on the exterior, tubular at the base, subcampanulate toward the apex, half divided into 4 oblong and obtuse segments; its lobes only sparsely pubescent on the inner surface; stamens 4, inserted upon the tube 1 mm. below the throat and alternating with the segments; filaments very short; anthers 1 mm. long; style glabrous, slightly exerted, its apex mitre shaped.

Type specimen collected by A. E. Yoder on Mount Midiaas, Province of Antique, Panay, April, 1905.

++ ++ Stipules 3 to 5-pectinate.

= Corolla tubular.

4. O. benguetense n. sp. A lax profusely branched 2 m. high sbrub; its ultimate branches angular and with numerous nodules of leaf scars. Leaves membranous, glabrous, usually clustered toward the ends of the twigs, but soon deciduous, 1 to 1.5 cm. wide, 3 to 5 cm. long including the 5 mm. long petiole, lanceolate, the acuminate apex frequently somewhat curved, the 3 to 5 pairs of faint nerves anastomosing above the middle; stipules pubescent, 3 to 5-forked or pectinate, its connate coriaceous base persistent and becoming glabrous. Flowers in subterminal axillary cymes, shorter than the leaves; ascending peduncles and slender pedicels glabrous, subtended by foliaceous bracts; calyx smooth, turbinate; its 4 green segments oblong, 2 mm. long and with obtuse apex; corolla tubular, 8 mm. in length including the lobes, pink color, glabrous on the exterior; segments 4, obtuse, 3 mm. long, smooth on the ventral surface above the middle, reflexed, densely greenish yellow pubescent towards the throat; tube hairy on the interior above the middle; stamens 4, alternating with the corolla segments, sessile on the tube 1 mm. below the throat; style slender, glabrous, much protruding, bearing a large capitate or obscurely lobed stigma; capsule distinctly 2-celled.

Type specimen 6243, A. D. E. Elmer, Mount Santo Tomas, Province of Benguet, Luzon, May, 1904. It forms tangled masses of undershrub thickets at 2600 meters.

= = Corolla campanulate.

ℨ Inflorescence glabrous; leaves subcoriaceous, also glabrous.

5. O. stylosa R. Br.

ℨ ℨ Inflorescence cinereous; leaves membrsanou, puberulous beneath.

6. O. banksii n. sp. Shrub 1 m. high. Leaves broadly lanceolate or lanceolate, 5 to 8 cm. long including the 1 cm. long pubescent petiole, acute or acunimate, base cuneate, subglabrous above, strigosely pubescent beneath especially along the midvein and on the 5 to 7 obscure lateral pairs; stipule united, shallow, pubescent, the 3 to 5 laciniate lobes gland tipped. Inflorescence cymosely paniculate, puberulous or strigose, shorter than the leaves, in the upper axils; peduncles and pedicels subtended by linear foliaceous bracts, the former usually 3-forked; calyx 3 to 4 mm. long including the segments, strigose, surmounted upon 3 mm. long pedicels; lobes 4, green, persistent, oblong, obtuse, subglabrous, 2 mm. long, ultimately much reflexed; corolla campanulate, 5 mm. long, glabrous on the exterior, pubescent on the interior near the throat, the 4 segments triangularly obtuse, 2 mm. long, reflexed; stamens 4, inserted upon the sinus of the corolla throat; filaments glabrous, erect, 1 mm. long; anthers about as long, introrse.

Type specimen collected by C. S. Banks on Cunlaon Volcano, Occidental Negros, March, 1902.

* * Herbaceous (Oldenlandia.)

+– Capsule strongly winged.

7. O. (596 Copeland.)

+– +– Capsules not winged.

++ Leaves ovate or lanceolate.

= Foliage in 1 or 2 whorles near the base.

8. O. nudicaulis Roth.

= = Foliage scattered along the stems.

𝔍 Plants about 1 m. high; leaves 8 cm. long, 3 cm. wide, with prominent parallel veins.

9. O. auricularia (Linn.) F. Muell.

𝔍 𝔍 Plants less than 1 m. high; leaves also smaller, not conspicuously nerved.

∞ Inflorescence in small subsessile umbels.

10 O. lineata (Roxb.) Elm.

∞ ∞ Inflorescence cymosely paniculate.

¶ Leaves ciliate at least along the edges, with evident nerves.

12. O. ciliata n. sp. Annual, 1 to 2 dm. high, usually erect and branched. Leaves opposite, all cauline, the larger one 1 cm. wide, 3 cm. long, ovate or lanceolate, acuminate, base abruptly norrowed, subsessile, its 5 to 7 parallel veins from near the base, subglabrous on both sides, paler beneath, short ciliate around the entire margin; stipule connate, membranous, fringed with 1 mm. long laciniate teeth. Inflorescence paniculately cymose, terminal or subterminal; terminal flowers sessile, lateral ones slenderly pedicelled, subtended by a tuft of short glistening bristles; calyx segments 4, green, short hipid on the margins, 2 mm. long; corolla 2 mm. long, divided into 4 segments; stamens alternating with the petals and inserted upon the sinus; anthers introse, nearly sessile; style 2-cleft; ovary obovoid, terete, smooth, 2-celled; seeds numerous, upon a stalked capitate receptacle in each cell, concavely flattened, the dorsal side reticulate, the ventral side bearing an elongated attachment scar in the center and which is conspicuously radially nerved.

Type specimen 6615 A. D. E. Elmer, Baguio, Province of Benguet, Luzon, June, 1904. In loose soil amongst bowlders of the limestone formation.

¶ ¶ Leaves glabrous, obscurely nerved.

12. O. paniculata Linn.

++ ++ Leaves linear or filiform.

= Root annual.

13. O. corymbosa Linn.

═ ═ Root bi or perennial.

𝔉 Pedicels very slender, usually from the uppermost axils.

15. O. horneriana Miq.

𝔉 𝔉 Pedicels shorter, from all the axils.

∞ Flowers usually solitary.

16. O. heynii Don.

∞ ∞ Flowers usually three in each axil.

17. O. tenelliflora (Blm.) Elm.

OPHIORRHIZA LINN.

* Flowers single or in pairs.

1. O. biflora n. sp. Herbaceous, probably an annual, spreading from the base into many decumbent or suberect branches of which the longest are 8 cm.; stems short pubescent throughout. Leaves opposite or whorled from the apex of short branchlets, thin, 3 to 5-nerved, lanceolate or narrowly oblong, acute at apex, base attenuate, 1.5 cm. long including the 2 mm. long petiole, 5 mm. wide, lower surface paler, both sides bearing a few short hispid hairs especially along the edges; stipules bristle like. Flowers white, terminal, single or in pairs, short pedunculate or subsessile, subtended by bristle like bracts; calyx pubescent, bearing 5 acute segments, corolla 6 mm. long including the 5 segments, tubular, glabrous on the exterior; its segments half the entire length, quite broad and rotately spreading, acute, finely pubescent on the ventral surface, the throat more densely pubescent with yellowish hairs; stamens 5, not protruding, inserted upon the corolla near the base; anthers linear, at least 1 mm. long, truncate or obtuse at both ends; filaments slender, glabrous, style exceeding the throat, subglabrous, somewhat flattened, apex bifid; capsule much compressed and emarginate, 6 mm. wide, 3 mm. long, pubescent, splitting at the base in 2 broad valves, each of which bears 2 minute bracts on the sides, central placenta forked; seeds numerous, angular, its sides light brown and with darker colored edges.

Type specimen letter "W" E. B. Copeland, Mount Apo, Province of Davao, Mindanao, October, 1904. On mossy logs at 2000 meters.

* * Flowers more numerous.

+ Perennial herbs.

2. O. oblongifolia DC.

+ + Suffrutescent or woody.

++ Mature infrutescence and leaves usually staining red while drying.

3. O. mungos Linn.

++ ++ Infrutescence and leaves not turning red.

= Inflorescence and nerves beneath the leaves ferruginous pubescent.

4. O. acuminata DC.

= = Inflorescence and leaf nerves subglabrous or puberulous with yellowish hairs.

5. O. harrisiana Hey.

PSYCHOTRIA LINN.

* Drupes elongated, spindle shaped or fusiform.

1. P. philippinenses C. et S.

* * Drupes obovoid or subglobose.

+ Drupes upon 1 cm. long pedicels.

2. P. longipedicellata n. sp. Shrub 2 to 3 m. high; young branchlets rusty pubescent, soon becoming glabrous. Leaves turning slightly red while drying, membranous, opposite, usually clustered or subverticillate at the ends of the branches, abovate or lanceolate, opex rounded or obtuse, base abruptly cuneate or rounded, paler beneath, 7 to 12 cm. long including the 1 to 2 cm. long rufous pubescent petiole, 3 to 5 cm. wide, glabrous except the dark brown pubescent midvein beneath, lateral nerves 9 to 13 pairs; stipule broad, base acute, 1 cm. long, subglabrous. Flowers axillary or subaxillary, upon short pubescent 5 mm. long pedicels; calyx 1 mm. long, turbinate, its rim minutely fringed; corolla glabrous on the outside, pilose at the throat, campanulate, 4 mm. long, divided into 5 reflexed obtuse segments; stamens 5, inserted upon the throat and alternating with the segments; filaments 1.5 mm. long, glabrous; anthers 0.5 mm. in length; style not exceeding the throat, subclavate, glabrous, the apex bifid, persistent; drupe 2-celled, obovoid, 6 mm, long, 4 mm. in diameter at the top, glabrous, upon 1 cm. long pedicels; pericarp thin, purple when mature; pyrenes solitary in each cell, acute at base, rounded at apex, ventral side flat or only a trifle convex in the center toward the base, dorsal surface obscurely 3 to 5-ridged, attached to the central plancenta near the base.

Type of fruiting specimen 907, H. N. Whitford, Lagumanoc, Province of Tayabas Luzon, September, 1904; flowering specimen 1727, Forestry Bureau, collected by W. W. Clark, Burias, June, 1904.

+ + Drupe sessile, capitate, upon three 1 to 2 cm. long peduncles.

3. **P. bataanensis n. sp.** A lax 2 m. high shrub, its young twigs short brown pubescent. Leaves obovate or oblong, opposite, apex obtuse or rounded, base truncately rounded or frequently subauriculate, the larger ones 5 cm. wide, 14 cm. long including the 1.5 cm. long dark brown pubescent petiole, reddish brown when dry, glabrous above, short dark brown pubescent on the very prominent midvein and nerves; lateral nerves pinnate, 17 to 20 on each side, anastomosing at their ends; stipule subglabrous, rigid, acute, 8 mm. long, deciduous. Flowers terminal, sessily clustered upon 3 short densely ferruginous pubescent peduncles, nearly white; calyx similarly pubescent, turbinate, 3 mm. long, its rim finely fringed; corolla glabrous except the pilose throat, subcampanulate, divided into 4 rather thick obtuse segments; stamens 4, inserted upon the throat, alternating with the straight and adnate segments; filament 1 mm. long, glabrous; anthers introrse, 1 mm. long, comparatively broad; style short, glabrous, subpersistent, its stigma mitre shaped; drupe 2-celled, cardinal red when fully mature, in 3 capitate clusters, each of these upon 1 to 2 cm. long peduncle, obovoid, sessile, 6 mm. long, 4 mm. in diameter near the top, with

thin and glabrous pericarps; pyrene single in each cell, sharply pointed at base, rounded at apex, ventral side flat, dorsal surface 3 to 5-ridged, attached below the middle.

Type of fruiting specimen 6980, A. D E. Elmer, Mount Mariveles, Province of Bataan, Luzon, November, 1904.

+ + + Drupes 1 to 3, sessile or only shortly pedunculate.

4. P. subsessiliflora n. sp. Shrub 2 to 3 m. high. Leaves opposite, about 1 cm. apart, narrowly elliptic to obovate or oblanceolate, glabrous on both sides, 3 to 5 cm. wide, 8 to 12 cm. long including the glabrous 8 mm. long petiole, apex abruptly acute, base cuneate or obtuse, 8 to 11 pairs of lateral nerves, lower surface grayish white, membranous; stipules deciduous, leaving a fringe of brown ciliate hairs. Fruits terminal, usually with a single short pedicellate one and 1 to 3 subsessily clustered upon a 1 cm. long peduncle; drupe 2-celled obovoid, glabrous, red when mature, 8 mm. long, 6 mm. in diameter, its pericarp rather thick; pyrene obtuse at base, truncately rounded at apex, prominently 5-ridged or winged; drupes attached near the base.

Type specimen 722, H. N. Whitford, Atimonan, Province of Tayabas, Luzon, August to September, 1904.

+ + + + Drupes in cymose panicles.

++ Scandent shrubs.

= Leaves ovate, all opposite, glabrous.

5. P. manillensis Bartl.

= = Leaves lanceolate, opposite, glabrous; its cymose panicle congested.

6. P. sarmentosa Blm.

= = = Leaves lanceolate, pubescent on the nerves beneath, the upper ones subverticellate; panicle lax.

7. P. celastroides Griseb.

++ ++ Erect shrubs.

= Dorsal side of pyrene smooth or only slightly ridged.

ʒ Corolla tubular, 1 cm. long.

8. P. malayana Jack.

ʒ ʒ Corolla campanulate.

9. P. tacpo (Blco.) Rolfe.

= = Dorsal side of pyrene prominently ridged.

𝔉 Lower surface of leaves ferruginous pubescent along the nerves.

10. P. rubiginosa n. sp. Shrubby, 3 to 5 m. high; its stout young twigs dark brown pubescent. Leaves chiefly at the ends of the branchlets, ascending, opposite, 1 to 3 cm. apart, the larger ones 35 cm. long, 8 cm. wide, oblanceolate or often somewhat obovate, coriaceous, edges little recurved, drying to a reddish brown, shining, glabrous on the uper surface, rufous pubescent beneath especially along the midrib and on the 14 to 17 pairs of lateral nerves which are distinctly submarginally united; petiole 1 to 3 cm. long, glabrous above, pubescent beneath; stipule densely covered with reddish brown hairs or becoming subglabrous, connate at base, coriaceous, ovate, apex usually with 2 acuminate teeth. Panicle terminal, much shorter than the leaves, upon a 5 to 8 cm. long dark ferruginous pubescent peduncle, ovate in outline, 8 cm. long and nearly that across the base; branches and branchlets similarly pubescent, dichotemously branched and nearly at right angles, subcompressed, subtended by short persistent bracts; flowers whitish, fragrant, sessile; calyx easily falling, 3 mm. long, brown puberulous, turbinate. its shallow rim 5-apiculate; corolla subcampanulate, united at the base, 5 mm. long, glabrous on the outside, throat villous, its 5 segments oblong and obtuse; stamens also 5, inserted upon the throat and alternating with the corolla segments; filaments glabrous, 1 mm. long; anthers oblong, 1 mm. long; styles not exceeding the throat, gradually tapering from the base; bifid stigma; drupe 2-celled, obovoid, nearly 1 cm. in length; pericarp thin and glabrous, deep orange red when fully mature; pyrene, solitary in each cell, much tapering from the base, apex rounded, ventral face nearly flat or only slightly concave, dorsal side obscurely 5-ridged, centrally attached.

Type specimen 6718, A. D. E. Elmer, Mount Mariveles, Province of Bataan, Luzon, November, 1904.

𝔉 𝔉 Leaves glabrous.

xx Drupe 8 mm. in diameter at the top; lateral nerves of pyrenes expanded around the base.

11. P. banahaensis n. sp. Shrub, 1 to 2 m. high. Leaves subcoriaceous, glabrous, 9 to 11–nerved, elliptic or broadly oblanceolate, acute at apex, cuneate or obtuse at base, larger ones 9 cm. wide, 25 cm. long including the very thick and glabrous 3 cm. long petiole; stipule brown, glabrous, 1.5 cm. long, caducous. Infrutescence paniculate, terminal, rigid, glabrous; branches angular or flattened; drupe glabrous, broadly obovoid, yellowish red, 8 mm. in diameter at the apex, upon 4 mm. long pedicels, 1 cm. long, 2-celled; pyrene single in each cell, base obtuse or rounded, apex concave, ventral side flat, the dorsal convex surface with 3 middle wing like ridges, the lateral ones broadly expanded around the base.

Type specimen 983, H. N. Whitford, Mount Banahao, Province of Tayabas, Luzon, October, 1904.

∞ ∞ Drupe 5 mm. in diameter; lateral nerves of pyrenes not expanded.

12. P. pinnatinervia n. sp. Shrub, 5 to 7 m. high, with light gray bark on the branches. Leaves opposite, soon falling, membranous, lanceolate, larger ones 7 cm. wide, 22 cm. long including the stout 3 cm. long petiole, cuneate at the base, acuminate at the apex, glabrous on both surfaces, lateral nerves 13 to 16 pairs and very prominent beneath; stipules caducous. Infrutescence paniculate, terminal, usually 3-branched from the base, glabrous; drupes 2-celled, upon distichous branchlets, obovoid, glabrous, not exceeding 5 mm. at the top, 6 mm. long, upon 2 to 3 mm. long pedicels, its pericarp rather thin; pyrene solitary in each cell, rounded at apex, acute at base, dorsal convex face conspicuously 5-ridged, ventral side plane, attached near the base.

Type specimen 932, H. N. Whitford, Mount Banahao, Province of Tayabas, Luzon, October, 1904.

PAVETTA LINN.

* Leaves linear, 8 mm. wide, 10 cm. long.

1. P. manillensis Walp.

* * Leaves lanceolate or oblanceolate.

+ Foliage less than 3 cm. long.

2. P. parvifolia Vid.

+— +— Foliage much exceeding 3 cm. in length.

++ Leaves glabrous.

3. P. barnesii n. sp. A spreading shrub, about 5 m. high. Leaves chiefly clustered near the ends of the branchlets, membranous, glabrous, turning black while drying, oblanceolate, opposite, 3 cm. wide, 14 cm. long including the 2 cm. long petiole, apex obtuse or more frequently long acuminate at the base, its midnerve and 7 to 9 lateral pairs equally prominent on both sides; stipule glabrous, acute, subcoriaceous, 5 mm. long, nearly as broad across the base. Inflorescence terminal, not exceeding the leaves, paniculately cymose; lower branchlets subtended by broad bracts; pedicels 1 cm. long, ebracteate; calyx 3 mm. long, the lower half finely pubescent, terminated by 4 short teeth; corolla white, straight or often curved, nearly 3 cm. long, glabrous on the exterior; its 4 segments broadly linear, 8 mm. long, parallel nerved, obtuse, spreading; stamens 4, inserted upon the throat of the corolla; filaments very short; anthers linear, 12 mm. long, sagittate at the base; style slender, glabrous, except the puberulous protruded portion, exceeding the corolla by 2 cm.; stigma very minute, entire; fruit 5 mm. in diameter, smooth, globose, green when immature and containing a creamy white seed.

Type specimen 6788, A. D. E. Elmer, Mount Mariveles, Province of Bataan, Luzon, November, 1904.

++ ++ Leaves pubescent on nerves beneath.

= Inflorescence paniculately spreading; pedicels 5 mm. long.

4. P. indica Linn.

= = Inflorescence cymosely congested; pedicels less than 5 mm. long.

5. P. indica polyantha Hook.

PLECTRONIA LINN.

(Canthium Lam.)

* Spinescent shrubs.

+— Flowers slenderly pedicelled; leaves membranous, pubescent.

1. P. pedunculare (Cav.) Elm.

+— +— Flowers sessile or subsessile; leaves subcoriaceous, nearly glabrous.

2. P. horrida (Blm.) Elm.

* * Shrubs or small trees without spines.

+— Flowers few, sessile or subsessile upon short axillary or terminal branches subtended by setosely acuminate bracts.

++ Leaves glabrous.

3. P. lycioides (Rich.) Elm.

++ ++ Leaves pubescent.

4. P. (6405 Elmer.)

+— +— Flowers numerous, slenderly pedicelled.

++ Normal inflorescence simple, umbellate.

= Pedicels sessile in the leaf axils.

5. P. villarii (Vid.) Elm.

= = Pedicels upon a 1 cm. long axillary peduncle.

6. P. mite (Bartl.) Elm.

++ ++ Normal inflorescence cymose.

= Slender style much exerted; stigma mitriform.

7. P. didyma (Roxb.) Elm.

= = Style barely exceeding the corolla; stigma clavate.

8. P. arborea (Vid.) Elm.

PAEDERIA LINN.

1. P. foetida Linn.

RANDIA LINN.

* Leaf veins and calyx of flowers pubescent.

+— Calyx lobes obtuse or acute.

1. R. angatensis (Blco.) F. Vil.

+— +— Calyx lobes acuminate or laciniate.

++ Leaves 6 to 9-nerved, acute, elliptic to oblong or oblanceolate.

2. R. mindoroensis n. sp. Small trees, 5 m. high; young branches short pubescent, soon becoming glabrous. Leaves distichous, 4 cm. apart, opposite, membranous, oblong to elliptic or broadly oblanceolate, glabrous above, 5 cm. wide, 15 cm. long including the thick and pubescent 5 mm. long petiole, acute, or acuminate at apex, base obtuse or attenuate, paler beneath, more or less puberulous on the entire under surface but especially along the midvein and on the 7 to 9 pairs of lateral nerves; stipule yellowish pubescent, 4 mm. long, sharply acuminate. Infrutescence axillary, usually 1 to 3-clustered upon short branches or tubercles; pedicels 5 mm. long, olivaceous pubescent, subtended by short acutely pointed bracts; mature fruit subglobose, pubescent, 8 mm. in diameter, yellow, 2-celled; tubular calyx persistent, 5 mm. long, pubescent on the exterior, truncate or 5-toothed; seeds 3 to 5 in each cell, black, pitted on the exterior convex surface, inner surface smooth and angular.

Type specimen 3326, E. D. Merrill, Puerta Galera, Mindoro, October, 1903.

++ ++ Leaves 4 to 6-nerved, sharply acuminate, lanceolate or oblanceolate.

3. R. samalensis n. sp. Small tree, with smooth grayish white branches with yellowish canescent tips. Leaves scattered, opposite, submembranous, glabrous above, subglabrous beneath except the finely pubescent midvein and lateral nerves, elliptic to broadly lanceolate or oblanceolate, slenderly acuminate at the apex, obtuse at the base, the larger ones 12 cm. long including the 3 mm. long and densely short pubescent petiole, 4 cm. wide, the 5 to 7 pairs of nerves prominent beneath; stipule setaceously acuminate, pubescent, 5 mm. long. Flowers white, very fragrant, 1 to 3 in axillary fascicles, upon 5 mm. long pubescent pedicels; calyx cartilaginous, pubescent on the outside, glabrous on the inside, cylindric or subturbinate, 15 mm. long; segments 5, about 7 mm. long, linear or laciniate, with broad bases, apex minutely pointed, finely strigose; corolla glabrous, white, about 3 cm. long; its segments quite thick and twisted in the bud, ovate near the base, long acuminate above the middle, glabrous on both sides, 15 mm. long, irregularly spreading; tube 15 mm. in length, campanulate toward the apex, glabrous without, pilose within; stamens 4, alternate with the corolla segments, sessily inserted upon the throat; anthers introrse, 3 to 4 mm. long, obtuse at both ends; style equalling the stamens, glabrous; stigma cleft into 4 mm. long flattened arms; ovary sunken in a thick basal pericarp, 2-celled, apex with a large disk; ovules numerous in each cell; seeds chiefly united by a central pulpy mass, black, obscurely pitted, 0.5 mm. long, fusiform, ends acute.

Type specimen 847, E. B. Copeland, Samal Island, Province of Davao, Mindanao, April, 1904.

* * Leaves wholly glabrous; calyx also glabrous.

+ With axillary spines in the old leaf axils.

4. **R. uncaria n. sp.** A scandent shrub, with smooth ultimate branches, the stems and larger branches usually provided with stout recurved thorns. Leaves glabrous, smooth on both sides, elliptic to oblong or lanceolate to oblanceolate, 5 cm. wide, 15 cm. long including the 1 cm. long petiole, acute or acuminate, obtuse or rounded at the base, midnerve and 5 to 7 lateral pairs very prominent beneath; stipule glabrous, 4 mm. long, broad at the base, sharply pointed. Inflorescence terminal, cymosely branched, upon short rigid peduncles; branchlets short, subtended by acute connately united bracts; pedicels 5 mm. long, subtended by 2 unequal acute bracts; calyx tubular, 7 mm. long, pulverulent, bearing 5 to 7 sharply pointed teeth; tube of corolla 2 cm. long, slender, glabrous on the exterior, pubescent on the interior from the throat down to the middle; corolla segments 5, about 12 mm. long, 4 mm. wide, obtuse or acute; stamens 5, inserted upon the throat; filament very short, pubescent, thread like; anther linear, 6 mm. long, acuminate at apex, sagittate at base; style glabrous, little exceeding the corolla; stigma cleft and flattened into 2 arms; fruit subglobose or a trifle elongated, 1 cm. in diameter, 2-celled; seeds triquetrous, black, 3 to 5 in each cell, embedded in a pulpy mass.

Type specimen 7001, A. D. E. Elmer, Mount Mariveles, Province of Bataan, Luzon, November, 1904.

+ + Without spines.

++ Leaves chartaceous; corolla very short tubular or subcampanulate; inflorescence paniculate.

5. R. fitzalani F. Muell.

++ ++ Leaves not chartaceous; corolla tubular; inflorescence cymose, fascicled or umbellate.

= Infrutescence umbellate, all pedicels from short axillary tubercles.

6. R. umbellata n. sp. Glabrous shrubs. Leaves subcoriaceous, narrowly elliptic to oblong, 6 cm. wide, 18 cm. long, sessile or on very short petioles, lucid green on the upper surface, paler beneath, with 8 to 12 pairs of lateral nerves, obtuse or acute at the apex, base obtuse or rounded; stipule coriaceous, sharply acute, 3 mm. long. Infrutescence umbellate, fascicled upon short tubercles in the axils of leaf scars; pedicels slender, glabrous, subtended by short and thick scales, about 1 cm. long; fruit globose, averaging 5 mm. in diameter, 2-celled, apex truncate and with a large circular disk; seeds numerous, small, triquetrous, light brown, embedded in a pulpy mass, but faintly pitted.

Type specimen 1302, E. B. Copeland, Todaya, Province of Davao, Mindanao, April, 1904.

= = Infrutescence fascicled or cymose, the pedicels subtended by bracts.

£ Calyx rim short, truncate or obscurely toothed and scarious; fruit subsessile, fascicled.

7. R. fasciculiflora n. sp. A shrub, 3 m. high; branchlets smooth, grayish white. Leaves shining and coriaceous. elliptic lanceolate or oblanceolate, paler beneath, 4 cm. wide, 9 cm. long including the 5 mm. long petiole, acute at the apex, attenuate at the base, with 5 to 7 lateral pairs of veins rather obscure; stipule coriaceous, glabrous, the broad base persistent, 7 mm. long, terminating into a slender awn. Inflorescence fascicled in the lower leaf axils or in the axils of the leaf scars; flowers 3 or more from a short bracteate receptacle, short pedicellate; calyx turbinate, glabrous, the lower 6 mm. united to the ovary, the upper portion rim like, entire or obscurely toothed; corolla tubular, 10 mm. long including the segments, glabrous on the exterior, easily separating from the base; segments 4, much reflexed, 4 mm. long, apex obtuse, broadly oblong, densely villose on the central portion of the ventral surface; stamens 4, alternate with the segments and inserted upon the throat, sessile or subsessile; anthers introrse, linear, 2 mm. long, basifixed, acute or obtuse at each end; style included, 2-cleft, glabrous; ovary bearing a broad disk, 4-divided; fruit globose or nearly so, 7 mm. in diameter, with a persistent calyx rim, smooth; seeds solitary in each cell, oblong and somewhat angular, 3 mm. long, its ventral side plano convex, the dorsal side grooved and concave.

Type specimen 6900, A. D. E. Elmer, Mount Mariveles, Province of Bataan, Luzon, November, 1904.

‡ ‡ Calyx short tubular, toothed but not scarious; fruit distinctly pedicellate upon cymes.

∞ Fruits upon 1 cm. long pedicels, without calyx tubes.

8. R. cumingiana Vid.

∞ ∞ Fruits upon pedicels less than 5 mm. long, crowned by a short calyx tube.

9. R. densiflora (Wall.) Benth.

RUBIA LINN.

1. R. cordifolia Linn.

SCYPHIPHORA Gaertn.

1. S. hydrophyllacea Gaertn.

SARCOCEPHALUS AFZEL.

* Base of leaf rounded or subcordate.

+ Leaves 7 to 9-nerved, ovate to oblong.

1. S. cordatus Miq.

+ + Leaves 11 to 14-nerved, elliptic to oblong

2. S. undulatus Miq.

** Base of leaf obtuse or acute.

+ Leaves submembranous, apex acute.

3. S. junghughnii Miq.

+ + Leaves coriaceous, apex rounded or sometimes obtuse.

4. S. ovatus n. sp. Tree, 6 m. high; branchlets rigid the younger ones glabrous and dark brown. Leaves glabrous, coriaceous, opposite, 3 to 4 cm. apart, quite variable in size, the largest ones 9 cm. wide, 18 cm. long including the glabrous 2.5 cm. long petiole, ovate or somewhat elliptic, apex obtuse or rounded, base acute, its midnerve and 5 to 7 lateral pairs very prominent beneath, dark brown when cured; stipule subcoriaceous, entire, obtuse, 5 mm. long, pulverulent on its outer surface. Inflorescence capitate, upon 2 cm. long peduncles which are articulate at about the middle, 2.5 to 4 cm. in diameter; calyx with slender clavate pubescent and deciduous appendages; corolla reddish, 10 mm. long, glabrous without, subglabrous or finely pubescent within the tube, gradually expanding from the base; its 4 segments glabrous, 2 mm. long, rather broad, truncately rounded at apex; stamens 4, included, sessily inserted upon the corolla tube 1 mm. below the rim; anthers introrse, 1.5 mm. long, 1 mm. wide, oblong or elliptic, apex rounded, base subauriculate; style slender, glabrous, much exceeding the corolla; stigma large, clavate or fusiform.

Type specimen 3150, Forestry Bureau, collected by Ahern's collector, Bosobosa, Province of Rizal, Luzon, May to June, 1905.

STLYOCORYNE CAV.

* Leaves 10 to 12-nerved, 14 to 18 cm. long.

+ Inflorescence and lower surface of leaves subglabrous.

1. S. macrophylla Bartl.

+ + Inflorescence and lower surface of leaves ferruginous pubescent.

2. S. pubescent Bartl.

* * Leaves only 5 to 8-nerved, less than 14 cm. long.

+ Apex of leaf obtuse or rounded; berries numerous, 7 mm. in diameter.

3. S. webera Wall.

+ + Apex of leaf acute; berries few, 10 mm. in diameter.

4. S. incerta (K. et V.) Elm. Tarenna incerta K. et V.

SPERMACOCE LINN.

* Leaves hispidly pubescent.

1. S. hispida Linn.

* * Leaves subglabrous.

2. S. ocymoides Burm.

TRICALYSIA. RICH.

1. T. tinagaoense n. sp. A small tree or shrub. Leaves submembranous, 14 to 20 cm. long including the 1 cm. long petiole, 7 to 10 cm. wide, glabrous on the upper surface, puberulous beneath on the midvein and on the 7 to 10 pairs of lateral nerves; stipule subglabrous, 5 mm. long, acuminately pointed. Flowers in loose cymose clusters from the axils of the fallen leaves; berries upon 0.5 to 1 cm. long cinereous pedicels which are frequently short bracteate, usually 3 to 5 from short bracteate tubercles, subglobose, 7 mm. in diameter, its base more or less short pointed, apex mamillate, 2-celled, with thin pericarp, glabrous; seeds 6 in each cell, dark brown, angular, sides irregular in shape and size, usually compressed, about 4 mm. across, closely set together, without pulpy tissues between them.

Type specimen 417, G. P. Ahern collected by J. F. Quadras, Tinaga, March to May, 1901.

TIMONIUS RUMPH.

* Leaves densely pubescent at least beneath.

→ Base of leaf long attenuate.

1. T. attenuatus n. sp. Shrub, 7 m. high, with young twigs pubescent. Leaves opposite, submembranous, adpressed pilose beneath, subglabrous above, obovate or oblanceolate, with 7 to 9 pairs of ascending nerves, apex acute or acuminate, base long tapering into the 1.5 cm. long pubescent petiole, 7 to 10 cm. long with the petiole, 2.5 to 4 cm. wide; stipules 4 mm. long, rusty pubescent, slenderly acuminate. Long pedunculate cymes axillary, densely brown pubescent; flowers short pedicellate, subtended by a single linear inconspicuous bract; calyx densely covered with light yellowish hairs, turbinate, 15 mm. long, its rim truncate and entire; corolla 18 mm. long, tubular, similarly pubescent on the exterior, terminating into 4 to 6 ovately obtuse segments; anthers linear, 3.5 mm. long, dorsifixed, little exceeding the throat; style slender, not exceeding the stamens, subglabrous or only finely puberulous, divided into 2 arms; fruit elongated, compressed or obscurely quadrate, 4-celled, 1 cm. long, widest across the base, subglabrous, bearing the short persistent calyx.

Type specimens 1867 and 2805, Forestry Bureau, Bosoboso, Province of Rizal, Luzon. Former number with immature fruit was collected in September, 1903; the latter with flowers in July, 1903.

+ + Base of leaf abruptly rounded.

2. T. benguetensis n. sp. A shrub, 3 m. high, its ultimate branches lax and slender. Leaves clustered toward the ends of the branchlets, easily separating or falling and leaving subcircular scars, the larger ones 3 cm. wide, 8 cm. long including the 3 to 5 mm. long strigose petiole, membranous, 7 to 9-nerved, apex acute, oblong or oblanceolate, the lower half often narrowly elongated and slightly unequal, yellowish or cinereously pubescent beneath, only sparsely so on the nerves above; stipule triangularly acuminate, strigose. Flowers axillary, not exceeding the leaves, single or in pairs upon the strigose flexuose 1.5 cm. long peduncle, subtended by 2 foliaceous bracts which equal the calyx segments; calyx densely covered with dirty yellowish hairs, campanulate; its 4 segments linear, 3 mm. in length, subglabrous on the inner face, ultimately spreading but persistent; corolla tubular, 7 mm. long, pubescent on the exterior, yellow, with 4 short obtuse segments; stamens 4, inserted upon the corolla tube 2 mm. below the throat, sessile; anther 3 mm. long, linear and tapering toward the apex, its basal part extending into tail like spurs; style not exceeding the corolla, thick and 3 to 5, parted at the apex; ovary 4-celled.

Type specimen 6396, A. D. E. Elmer, Twin Peaks, Province of Benguet, Luzon, May, 1904. On bluffs along the Bued River.

* * Leaves not densely pubescent.

+ Leaves ternate.

3. T. ternifolia (Bartl.) F. Vil.

+ + Leaves opposite.

++ Calyx extended into linear segments.

4. T. quadrasii n. sp. Apparently a shrub or small tree Leaves submembranous, 5 to 8 cm. wide, 14 to 18 cm. long, narrowly elliptic or oblong, apex obtuse or short acute, subauriculate or abruptly rounded at base, subsessile, 8 to 11-nerved, subglabrous above, sparsely brown pubescent beneath except long the nerves; petiole very short, pubescent; stipules similarly pubescent, short and broad, terminating into a 2 mm. long bristle. Inflorescence ferruginous pubescent, axillary or terminal, its panicle rather short and congested; the branches subtended by densely pubescent acute bracts; flowers subtended by short united bracts; calyx dark brown pubescent on the exterior, 7 mm. long including the teeth, the interior densely pubescent with whiter adpressed hairs; segments 5, laciniate, erect, 3 mm. long, pubescent on both sides; style persistent, 10 mm. long, glabrous, usually recurved, entire; corolla not twisted in bud, adnate, pubescent on the exterior, united toward the base, 5-segmented; segments about 4 mm. long, obtuse, narrow and somewhat 3-sided, fleshy; stamens 5, subsessile, attached near the base of the corolla tube; anthers linear, 3 mm. long, finely ciliate along the edges.

Type specimen 545, J. F. Quadras, Tetuan, Province of Zamboanga, Mindanao, March to June, 1901.

++ ++ Calyx entire or obscurely apiculate.

= Leaves obovate with rounded apices.

5. J. obovatus n. sp. Shrubby or tree like, with young twigs glabrous and usually flattened or angular. Leaves opposite, coriaceous, glabrous on both sides, obovate, broadly rounded at the apex, 5 to 7-nerved, the larger ones 14 cm. long including the 2 cm. long petiole and 7 cm. wide; stipules obovate, rounded at apex, entire, coriaceous, 1 cm. long and 5 mm. wide or larger, glabrous, nerveless. Infrutescence axillary, not exceeding the leaves, usually 1 or 2-forked; calyx glabrous, sessile, its short rim entire and leathery; fruit globose, 6 mm. in diameter, glabrous, numerously costate on the exterior, 20 to 30-seeded; seeds brown, glabrous and very hard, subterete, ends acute, 5 mm. long, usually curved or the outer ones subfalcate.

Type specimen 48, S. Garcia, Province of Principe, Luzon, August, 1902.

= = Leaves broadly oblanceolate, with acute or acuminate apices.

ℱ Flowers sessile upon a scirpoid branching cyme.

6. T. philippinensis Merr.

ℱ ℱ Flowers short pedicellate upon pedunculate cymes.

7. T. rumphii DC.

UNCARIA SCHREB.

* Leaf base emarginate or cordate.

+ Foliage membranous.

1. U. hookeri Vid.

+ + Foliage coriaceous.

++ Flowers 4 cm. long; leaves ovate to rotund.

2. U. sclerophylla Roxb.

++ ++ Flowers 2.5 cm. long; leaves ovate to oblong.

3. U. pedicellata Roxb.

* * Leaf base rounded or cuneate.

+ Foliage coriaceous.

++ Leaves canescent beneath.

4. U. canescens Korth.

++ ++ Leaves wholly glabrous.

5. U. pteropoda Miq.

+ + Foliage membranous.

++ Bracts subtending the heads; calyx segment filiform, with broadened bases.

6. U. florida Vid.

++ ++ Bracts half way on the peduncles; calyx segments not filiform.

7. U. philippinensis n. sp. Scandent shrubs, with angular branches; young twigs reddish brown, sparsely pubescent with similarly colored hairs. Leaves opposite, ovate to elliptic, apex abruptly acuminate. base rounded or obtuse, membranous, sparsely strigose on both sides especially along the 6 to 8 pairs of dark brown colored nerves, soon becoming nearly glabrous, 3 to 4 cm. wide, 7 to 11 cm. long including the 5 mm. long pubescent petiole; stipule subpersistent, brown, membranous, finely pubescent, rather broad, 8 mm. long, divided nearly to the base. Peduncles 4 cm. long, opposite and axillary, reddish brown pubescent, much compressed toward the base, articulate and subtended by a whorl of bracts at the middle; the upper peduncles usually inwardly curved and flower bearing; the lower peduncles breaking at the articulations and strongly recurved; bracts brown, scarious, nearly 1 cm. long, pubescent, its 3 to 6 lanceolate segments free or united below the middle; heads 3 cm. in diameter when in full flower, without an involucre; calyx silkily pubescent with whitish adpressed hairs, fusiform, its tube and segments less pubescent on the outside; the 5 calyx lobes oblong, abruptly pointed, inner face glabrous, each alternating with a minute point from the base; corolla early falling, yellowish white, 16 mm. long, slender at the base and gradually tapering toward the top, wholly glabrous; its 5 lobes thickened, lateral edges recurved, 2 mm. long, 1 mm. wide, apex rounded; stamens 5, sessily inserted upon the throat, alternating with the segments; anthers acute at each end, 1 mm. long; style much exceeding the corolla lobes, slender, glabrous, bearing a clavate stigma; fruiting head 2 to 3 cm. in diameter; capsule short stipitate, 14 mm. long, 1.5 mm. in diameter, about 10 costate, glabrous when mature, the lower half slenderly tapering, the apex obtuse, septicidally 2-valved; seeds numerous, brown, orbicular, each end provided with slender hyaline wings.

Type specimen with flowers 322, R. C. McGregor, Baco River, Mindoro, April to May, 1905; fruiting specimen 762, H. N. Whitford, Province of Tayabas (Infanta), Luzon, September, 1904.

UROPHYULLM WALL.

* Fruit subsessile, 1 cm. in diameter.

1. U. sablanense n. sp. Shrub, 4. m. high, with thin smooth bark; branches few, slender. Leaves distichous, usually about 3 or 4 pairs towards the ends of the twigs and 5 cm. apart, subcoriaceous, glabrous on both sides, lanceolate or oblanceolate, apex slenderly acuminate, base acute, 5 cm. wide across the middle, 20 cm. long including the 1.5 cm. long somewhat thickened petiole, the 10 to 13 pairs of nerves very prominent on the lower surface; stipule subglabrous, 15 cm. long, linear or lanceolate, caducous. Flowers solitary or in pairs, axillary, sessile, subtended by 2 cupular bracts; the basal one thick truncate, 2 mm. long and enclosing the miner one which is very similar except in length; calyx 1 cm. long, 5 mm. across the middle, chartaceous, its rim entire, 2 mm. long, hairy on the inner surface; corolla of about 7 segments 11 mm. long, united at the base, cinereous on the outer surface, straight and adnate, thick, acuminate, with tufts of hair on the inner basal surface; stamens 7, inserted upon the corolla near the base, alternate, sessile; filaments glabrous, adnate to the corolla, 1.5 mm. long; anther dorsally attached, 1 mm. long; style short, bearing an ovoid stigma which finally becomes 5 to 7 laciniately lobed; fruit subglobose, subsessile in the lower leaves or in the leaf axils, subtended by a persistent involucre of 4 broadly rounded lobes, crowned by the subentire calyx tube, 5 to 7-celled, its partitions comparatively thin; seeds very numerous in each cell and imbedded in a fleshy pulp, brown, smooth, less than 0.5 mm. in diameter, almost globose, only obscurely pitted.

Type specimen 61 31, A. D. E. Elmer, Sablan, Province of Benguet, Luzon, April, 1904.

* * Fruit pedicellate, smaller.

+ Infrutescence umbellate, much exceeding the petiole.

2. U. glabrum Jack.

+ + Infrutescence solitary or only in few flowered umbels, not exceeding the petioles.

++ Leaves 7 to 12 cm. long, slenderly acuminate, broadly lanceolate; fruit pedicel 4 mm. long or less.

3. U. streptopodium Wall.

++ ++ Leaves 12 to 20 cm. long, narrowly elliptic, short acute; fruit pedicels always longer.

4. U. bataanense n. sp. Shrub, 4 m. high, sparsely branched but widely spreading. Leaves opposite, thin, glabrous or with a few short hairs along the the 7 to 10 pairs of nerves beneath, their reticulations prominent on both sides, obtuse or acute at the base, acute or acuminate at apex, oblong or lanceolate, or oblanceolate, the larger ones 6 cm. wide, 20 cm. long with the 2 to 3 cm. long glabrous petiole; stipule 1 to 1.5 cm. long, submembranous, ovate or triangularly acute, apex obtuse, subglabrous, the scars with a fringe of hairs along the upper edge. Flowers axillary, solitary or when 2 or 3 short pedunculate and umbellate, subtended by short ciliate fringed bracts; pedicels 1 cm. long, glabrous; calyx glabrous, thick, campanulate, 5 mm. long, obscurely segmented; corolla glabrous on the exterior, easily separating, 8 mm. long including the 4 mm. long segments; the tube 5 mm. long, also glabrous on the interior, about 3 to 4 mm. wide at the base, much constricted toward the throat; the 5 segments reflexed, leathery, adnate, straight; throat densely pilose; anthers 5, sessily inserted upon the throat and alternating with the segments; stigma 3-lobed, sessile; berry 6 mm. in diameter, 4 mm. high, crowned by a 3 mm. deep cupular calyx rim, glabrous, 5-celled; seeds embedded in a pulp, numerous in each cell, brown, subglobose, pitted, 0.5 mm. in diameter.

Type specimen 6810, A. D. E. Elmer, Mount Mariveles, Province of Bataan, Luzon, November, 1904.

WEBERA SCHREB.

* Leaves glabrous on the upper surface, acute or acuminate.

1. W. luzonensis Vid.

* * Leaves pubescent along the nerves on the upper surface, obtuse or rounded.

2. W. cumingiana Vid.

WENDLANDIA BARTL.

* Entire under surface of leaves pubescent; slender corolla tube much exceeding the calyx.

1. W. luzonensis DC.

* * Leaves glabrous or only its nerves beneath pubescent; tube of corolla little exceeding the calyx.

2. W. paniculata DC.

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LEAFLETS
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A FASCICLE OF BENGUET FIGS

BY

A. D. E. ELMER.

—o—

The genus Ficus can always be recognized in the field or in the herbarium by its hollow fleshy fruit which bears on its inner surface numerous small flowers, and which is provided with an apical opening closely guarded by umbilical scales. The individual flowers are male, female, gall, neuter and pseudo-hermaphrodite; these are usually arranged in sets on the same or on different receptacles of the same or of different plants. The figs are diverse in size and color—ranging from the size of a pea to that of an ordinary orange, and in color are either green, pale white, yellow, red or dark purple. In general, the great mass of Philippine figs is found in the woods of the foothills and in the shrubberies of the subalpine regions. Comparatively few extend into the valleys and along the seacoast. Most of them are erect shrubs and trees; some are scandent or subscandent in habit; one or two of our species are liana; and on the island of Luzon one powerful cleaver is known. The ligneous structure of all our species is soft and contains a sticky chalk white or molasses colored fluid which oozes out of the wounds quite freely. A few of the broad leaved trees are successfully grown as shade trees in some of the Manila parks and gardens. None of the Philippine figs are edible. In the province of Benguet of middle northern Luzon the more genuine tree like species occur in the woodlands of the lower altitudes, and the shrubby ones usually inhabit the higher region of the limestone formation. None of the species are found on the extreme summits of the highest mountains.

Dr. King, in his monograph of the Indo-Malayan and Chinese Species of Ficus, includes them under seven sections. Since all of these different groups are represented by our species, his sectional characters are here reproduced:

Group I.—Pseudo-hermaphrodite; male flowers with 1 stamen and a rudimentary pistil. Peseudo-hermaphrodite flowers and gall flowers in one set of receptacles; fertile female flowers in another set.

I. PALAEOMORPHE.

Group II.—Unisexual or asexual; male flowers without rudimentary pistils.

Section I.—Male, gall, and fertile female flowers on the same receptacle.

II. UROSTIGMA.

Section II.—Flowers unisexual or neuter; male and gall flowers on one set of receptacles, fertile female and neuter flowers in another set.

III. SYNOECIA.

Section III.—Flowers unisexual; male and gall flowers in one set of receptacles, fertile female flowers only in another set.

A.—Flower monandrous.

a.—Receptacles chiefly axillary.

IV. SYCIDIUM.

b.—Receptacles mostly in fascicles from stem and branches.

V. COVELLIA.

B.—Flowers di rarely triandrous.

a.—Receptacles mostly axillary.

VI. EUSYCE.

b.—Receptacles mostly in fascicles from stem and branches.

VII. NEOMORPHE.

I. PALAEOMORPHE.

Male flowers with 1 stamen and a rudimentary pistil occupying the same receptacles as the gall flowers; fertile female flowers alone in another set of receptacles; perianth of fertile females usually gamophyllous, 4 or 5–cleft, rarely of separate pieces; small trees, erect, or subscandent shrubs.

1. F. celebica Blm. Bijd. 471, 1825-6. In the vicinity of Baguio this typical species is common in hardwood thickets and along streamlets of the pine region at 1600 m. altitude. It is a lax, numerously branched shrub with smooth and yellowish bark. Mature receptacles are soft in texture, yellowish red, the size of a cranberry, and persistently covered with a brown semihispid pubescence. *Cuming* collected in these Islands (particular locality unknown) a specimen which *Miquel* described in Lond. Journ. Bot. 8; 452, 1848 as *F. lancifolia*, but which *King* subsequently reduced to a synonym of this species. Outside from these Islands it is reported from Perak and the Celebes. Both my numbers 8000 and 8029 were collected in the same locality.

2. F. fastigiata n. sp. A shrub, 1 to 2 m. high, with numerous and fastigiate branches; wood moderately hard, covered by smooth brown bark. Leaves equilateral, 3 to 6 cm. long, 1 to 15 mm. wide, lanceolate or ovate lanceolate, acute at the base, apex long tapering or caudate, margin obscurely dentate above the middle, glabrous but finely scabrous, especially beneath, coriaceous, usually conduplicate upon its ventral side; veins conspicuous, 3 from the base, the 3 to 5 primary pairs often nearly at right angles to the prominent midvein, their ends connected below the margin; petioles as well as the youngest twigs scabrous, 3 to 5 mm. in length, brownish; stipules equalling the petioles, glabrous, setaceously acuminate.

Receptacle bearing a few scattered bracts, spheroidal in shape, 6 mm. in diameter, scabrous, with its umbilicus protruded, yellowish red when mature, solitary in leaf axils, its small triangular basal bracts unequally inserted; peduncles slender, 1 cm. long, usually recurved with its mature fruits, without bracts at the base; gall and male flowers upon one set of receptacles, female only in another set; gall flowers pedicellate, 4 mm. long, obovoid, bearing a short sublateral style; subtending perianth segments 4, brownish red, oblanceolate, nearly equal; staminate flowers subsessile, few, concealed by the inner umbilical scales; single stamen associated with a rudimentary pistil, enveloped by a similar perianth though only of 3 segments; filament 0.5 mm. long; anther broad, 1 mm. long, caudate; female flowers obovoid or ellipsoid, pedicellate, bearing a sublateral elongated style, its perianth usually of only 3 segments which are shorter and more unequal in length than in the other flowers; inner surface of the receptacle set with short entire triangular brown scales.

This species according to *King* is allied to *F. celebica Blm.* Bijd. 471, 1825-6. It does not seem credible that *Cuming's* specimen described by *Miquel* as *F. lancifolia* in Lond. Journ. Bot. 7; 452, 1848, can be identical with my specimen number 8001 from the higher alpine limestone region near Baguio. *Miquel's* species however, is nearer related to *Blume's F. celebica l. c.*

3. F. irisana n. sp. An erect shrub, 4 m. high, with moderately hard wood and smooth reddish brown bark; branches rather numerous, ascending. Leaves ovate to obovate or semioblong, obscurely inequilateral, 5 to 8 cm. long, 3 to 5 cm. wide, subcoriaceous, glabrous to pulverulent on both sides, lucid green on the upper surface, entire, base rounded with subequal halves, apex acute and frequently somewhat curved; primary as well as the secondary and transverse veins very prominent, the 3 to 5 pairs are strongly curved and submarginally connected; petioles 5 mm. long, brownish red, pulverulent.

Ovoid receptacles 5 to 8 mm. in diameter, upon a slender 5 mm. long peduncle, finely scabrous or pulverulent, dark yellowish red when mature, 1 to 3 from the leaf axils or in the axils of their scars, apex conical and with scales protruding; bracts triangularly acute, irregularly inserted upon the syconium and along the peduncles; our specimen contains only gall and pseudo-hermaphrodite flowers; staminate flowers few, between the inner umbilical scales, clavate, 1.5 mm. long, subsessile, completely enveloped by the 5 obovate entire membranously margined pieces of the perianth; stamen 1, always associated with a very rudimentary pistil; filament thread like, very short; anther as broad as long, 5 mm. long; gall flowers short stipitate, ovoid to obovoid, surrounded by 4 brown entire oblanceolate segments which are 1.5 mm. in length; style subterminal, 0.75 mm. long, bearing a small capitate stigma.

Type specimen number 8002 was discovered along a dry creek bed a few miles west of Baguio near the barrio of Irisan. Number 8013 determined as *F. obscura Blm.* Bijd. 474, 1825–6 and classed under the section of *Sycidium* has a strong resemblance and may prove to be the fertile female specimen of this species. But the leaves of that species are scabrous on both sides, long acuminate, and its receptacles are subsessile.

4. F. eucaudata n. sp. An erect shrub, 4 m. high, with lax spreading branches; bark on younger twigs smooth, grayish yellow. Leaves oblong lanceolate to oblanceolate, subcoriaceous, varying in size, 10 cm. long by 3 cm. wide, smooth and shining on both sides, edges entire, with acute bases, rather abruptly extended into the 2 cm. long caudate apex; veins very prominent beneath, straw colored, 3 from the base excluding the additional 3 to 5 primary pairs which in the typical specimen are conspicuously united below the margin; secondary ones irregular, also prominent; petioles 3 to 5 mm. in length, scaly brown.

Receptacles when fully mature red, solitary or in pairs from the leaf axils, globose, sparsely hispid, 1 cm. in diameter, abruptly contracted into a slender densely scabrous 1 cm. long pendulous peduncle like base which is subtended by 3 small bracteoles; fertile female flowers alone in our receptacles, 3 mm. in length, subtended by 3 or 4 hyaline perianth segments which are linear lanceolate and occasionally bearing a few soft hairs; achenes brownish yellow, very conspicuous, elongated ovoid, 1.5 mm. or slightly longer, 1 mm. across; style subterminal, slender, pale yellow; stigma dark brown, clavate, and in early stages appear to be united.

This shrubby fig is evidently closely related to *F. decaisneana Miq.* Fl. Ind. Bat. 2; 312, 1859. The latter, however, has umbonate short pedunculate and ebracteolate receptacles less than 5 mm. in diameter; and according to the figure in the Anns. Roy. Bot. Gard. Calc. 1; 1887, pl. 3, it has a prominently raised umbilicus and a capitate stigma. There are also some leaf differences. *F. eucaudata Elm.* also differs from *Miquel's F. acuminatissima* in Lond. Journ. Bot. 7; 233, 1848 collected by *Cuming* in Luzon, in its coriaceous leaves which are always wholly entire, caudate at least instead of acutely acuminate and with fewer perfectly glabrous nerves. Type specimen number 8003 was collected in thickets near Baguio. Number 8023 collected in the woods at Twin Peaks is a form of this species. It is extremely pretty with the globose strawberry colored pendulous fruits beneath the lucid green foliage.

5. F. confusa n. sp. A scandent shrub, clinging tightly about the bases of large trees or straggling in thickets; stem the size of a man's small finger covered with smooth yellowish bark. Membranous leaves ovate lanceolate, 10 to 16 cm. in length, 4 to 7 cm. in width, wholly glabrous on both surfaces or pulverulent beneath, slightly inequilateral, apex acuminate, base obtuse or acute, edges entire; veins not prominent, brownish, 10 pairs including the basal one, reticulations irregular; petioles 1 cm. in length, thick, deciduous at the base, yellowish and becoming scaly.

Receptacles usually two from the axils of the leaf scars, yellowish when mature, 7 mm. in diameter, nearly globose or obovoid, hard and smooth, abruptly extended into a thin 3 mm. long peduncle like base, subtended by 3 or more very short and rigid scales; receptacles of our specimens with only male and gall flowers; staminate ones immediately under the scales of the umbilicus, upon 1 mm. thick columnar pedicles, 3 mm. in length, the single stamen and rudimentary pistil subtended by 4 smooth subequal membranous acuminate 1 mm. long perianth segments; filament 0.75 mm. long, dark brown; anther short, elliptical, 0.5 mm. long; gall flowers varying in length, longer ones 4 mm. with a similar thick compressed or slightly angular pedicel; segments usually 3, tightly arching over the ovary, subequal in length, only 5 mm. long, acute and subcoriaceous; ovary 5 mm. long, ovoid or subglobose, deeply set upon the pedicel and not exceeding the segments; style subterminal, stiff, dark brown, 25 mm. long; stigma similarly colored, enlarged.

Type number 8004 collected at Twin Peaks is quite distinct, and has no close resemblance to any of the valid species of this section in *King's* monograph.

II. UROSTIGMA.

Male, fertile female, and gall flowers in the same receptacle; stamen 1, rarely 2; stigma elongate, usually acute; receptacles in the axils of the leaves or of the scars of fallen leaves, usually tribracteate at the base; leaves alternate, entire, coriaceous or subcoriaceous, rarely membranous; usually trees or powerful climbers; epiphytal at least in early life.

6. F. benjamina Linn. Mant. 129, 1707. This species is planted throughout the Malayan Peninsula and Archipelago, and is reported to be native on Timar, Sumatra and the Celebes. *Cuming* first collected it in these Islands from the province of Ilocos-Norte. My number 8005 was found in the Bued river gorge near Twin Peaks. It is a widely but rigidly spreading tree, 10 m. high, and presents a pleasing appearance with its mature blood red fruits.

7. F. glabella Blm. Bijd. 452, 1825-6. Specimen number 8006 is probably a form of this species, but the young leaves are entirely glabrous, and the coriaceous receptacles chiefly from the leaf axils, bearing a raised umbilicus, beautifully mottled with purplish dots which ultimately seem to stain the entire receptacle; basal bracts conspicuous, quite thin, broad and 3-lobed. Only a single tree was observed on a more or less exposed hill between Baguio and La Trinidad. Its distribution outside the Philippines is given from the Malayan Peninsula and Archipelago, Hong-Kong, the Andamans and Burmah, and in the tropical forests of the eastern Himalaya and Khasi Hills. It has previously been reported from these Islands from the Province of Ilocos-Norte in the northwestern part of Luzon.

8. F. indica Linn. Sp. Pl. ed. 2; pt. 2, 1514 (in part), 1762-1763. There is great uncertainty as to the typical form of *F. indica*, since *Linneus* referred plants of India, Africa and America under this same name. Most subsequent authors attach the name to specimens from the Malayan Peninsula and Archipelago which they believe to answer best the various descriptions and figures. It is very possible that ours is nearly identical to the Malayan form, except in the smaller size of its leaves and in the more numerous primary nerves. Number 8007 was collected in the vicinity of Baguio near the base of bluffs. It is a spreading 8 m. high tree, with dull brick red fruits and bright green foliage.

9. F. umbrina n. sp. A large much branched and spreading tree, 10 m. high; ultimate branches rather numerous, covered with a smooth brown bark. Leaves ovate to obovate or elliptic, acute at the apex, obtuse at base, 3 to 4.5 cm. wide, 6 to 9 cm. long, coriaceous, smooth and shining on both sides, with entire edges; nerves not prominent though equally visible from both sides, numerous, parallel, submarginally united, the midnerve very prominent beneath, straw colored; petiole glabrous, 1 cm. long, persistent to the blade but deciduous at the base leaving small oval scars; bud scales sharply acuminate, brown, glabrous, equalling the petiole.

Receptacles sessile and ebracteolate, usually in pairs from the axils of the leaves, elongate obovoid, apex depressed, hard, dull yellow or umber colored, glabrous, 1 cm. long, 7 mm. in diameter, bases gradually tapering, not terete but obscurely angular or irregular in shape; male, gall and fertile female flowers in the same receptacle; staminate ones subsessile, few and concealed beneath the umbilical scales, 15 mm. in length, its single stamen completely enveloped by 3 smooth dark brown coriaceous oblanceolate perianth segments; filament very short; anther 0.5 mm. long, subcordate; gall flowers 3 mm. in length, long pedicellate, bearing a short style, obovoid, subtended by 3 distinct entire otherwise similar segments; fertile female subsessile, its subtending perianth similar, with a very slender subterminal style bearing a dilated stigma; ovary 1 mm. in diameter, nearly globose; interior surface densely set with narrowly acuminate rather slender scales.

This fig tree, type specimen number 8008, is a very distinct species, and to my knowledge no near relatives have been discovered. The sessile ebracteolate peculiarly shaped and umber colored receptacles distinguish it at once from the great bulk of species under this section. Only one tree was observed at Kias near the waterfall.

10. F. longipedunculata (Merr.) Elm. *F. chrysolepis longipedunculata Merr.* Govt. Lab. Publ. 29; 11, 1905. A tree, 6 m. high, short and rigidly but sparsely branched from near the top; young twigs thick, angular when dry, with a smooth yellowish bark, very blunt, freely bleeding with a pale viscid fluid. Leaves ascending and crowded upon the ends of the branches, 1.5 to 2.5 dm. long, 5 to 8 cm. wide, subcoriaceous, perfectly glabrous on both sides, oblanceolate or narrowly elliptic, caducous, edges entire, apex abruptly acuminate, base acute; nerves 3 from the base, the 7 to 10 primary pairs submarginally united, reticulations obscure; petioles 3 to 5 cm. long, thick and glabrous; stipules linear, gradually tapering from the base, subpersistent, 6 cm. long, dry, membranous, brown and glabrous; bud scales dark brown, acuminate, 15 mm. long, smooth.

Receptacles usually in pairs and attached to the leaf axils, obovoid, 2.5 cm. long, 2 cm. in diameter, the base narrowed, apex rounded with a small sunken umbilicus, shining green, thick and hard, subtended by 3 acute bracts with broad bases and finely ciliate margins; peduncle 3 to 5 cm. long, wholly glabrous, persistent to the receptacle, without an annulus at its distal end; only male and gall flowers in our specimens and which easily become detached; umbilical scales thick, rigid, long and extending nearly to the center; staminate flowers monandrous, 3 mm. in length, pedicellate, scattered throughout the interior; its perianth barely enveloping the stamen, gamophyllous and 3-toothed; filament very short but rigidly cartilaginous, brownish black; anther caudate, dorsally recurved, almost as broad as long; gall flowers short or usually long pedicellate, ovoid to ellipsoid, subtended by a partly united membranous perianth whose segments become laciniate; style slender, 3 mm. in length, flattened, subterminally attached; interior surface numerously set with conspicuous laciniate dark and persistent scales.

This fig is intermediate between *F. annulata Blm.* Bijd. 448, 1825–6, and *F. chrysolepis Miq.* Ann. Mus. Bot. Lud. Bat. 3; 215, 1836–9, but is very distinct from either. From the former it differs in being a small tree; in having its leaf base always acute; longer petioles; smaller differently shaped receptacles without prominent umbos; and in its much longer peduncles without the curious thickened annulus. From the latter it differs in its very long perfectly glabrous stipules, much smaller receptacles and with two to three times longer peduncles; and in its thick blunt smooth twigs which become peculiarly angled when dry. Number 8009 was discovered along the river at Sablan where only one tree was observed.

11. F. magnifica n. sp. A large tree, 8 m. high; branches widely spreading but not drooping, with bark on the twigs smooth and yellowish gray. Leaves ovate or oblanceolate, equilateral, 5 to 8 cm. long, 2.5 to 4 cm. wide, subcoriaceous, glabrous on both sides, base obtuse, apex acute, obscurely 3-nerved at the base, with about 9 primary lateral pairs, united at the ends, secondary transverse nerves barely visible upon its under surface; petiole 5 mm. in length, somewhat enlarged, scurfy brown; bud scales 8 mm. long, smooth, setaceously acuminate.

Receptacles of the same tree at different stages of maturity, green, yellowish red, ultimately turning to a dark reddish brown or nearly black, erect or ascending before maturity, finally pendulous, always shining smooth, soft and somewhat juicy when mature, early falling, globose or nearly so, usually solitary in the leaf axils, 7 to 10 mm. in diameter, apex slightly raised and with a small annulus; its base abruptly contracted into a 3 to 5 mm. long peduncle like stalk subtended by 3 small but broad bracts; flowers all fertile female in our specimen; perianth usually of 4-cleft segments, lanceolate in outline, brown, membranous, apices slightly truncate; achene flattened and curved, 1.5 mm. long, 0.75 mm. wide, sessile, surrounded by a hyaline membrane, light yellow and glabrous, prominently crested especially on the edge of the apex; style barely 1 mm. long, subterminal, equalling the segments, bearing a dark brown clavate stigma; inner surface of the syconium sparsely hispid.

Type specimen, number 8010, was discovered in ravines and along the river at Sablan intermixed with other broad leaved trees. Here were a number of stately trees which were not observed in other localities. Nearest to *F. indica Linn.* Sp. Pl. ed. 2; 1514, 1762-3, but leaves not tuberculate; mature receptacles not hard, always pedunculate; involucral bracts small; ripe fertile achenes not viscid nor tuberculate.

III. SYNOECIA.

Flowers unisexual or neuter; male flowers with 1 stamen; male and gall flowers in one set of receptacles, fertile female and neuter flowers in another set, or the latter absent; climbers with large colored receptacles, the leaves tasselate beneath.

12. F. megacarpa Merr. Govt. Lab. Publ. 17; 14, 1904. This species was first collected by *P. T. Barnes* at Lamao, Province of Bataan, Luzon. The leaves of the type specimens are coriaceous, ovate to elliptical ovate, only slightly inequilateral. Those of my specimen number 8011 collected in the forests of Sablan are membranous, strongly inequilateral and from ovate to obovate lanceolate. These leaf differences are probably due to age. The fruits of my specimen are also more of the globose shape, dark purple when ripe and contain a very thick elastic substance. It is apparently not common and only occassionally met in woods of the hills and the intervening ravines. The young growing parts are profusely branched and tightly cleaving to trunks of trees. After having climbed a considerable distance the older stems become detached from the trunks and appear as guy ropes. From this liana the large heavy figs hang from short 6 cm. thick stalks.

IV. SYCIDIUM.

Flowers unisexual; male and gall flowers in one distinct set of receptacles; fertile female flowers in a distinct set of receptacles; male flower with 1 stamen, though sometimes with 2. Leaves alternate; receptacles small, axillary, more or less scabrous, a few have receptacles in fascicles from the stem; shrubs, small trees or climbers; rarely epiphytal.

13. F. cumingii Miq. Lond. Journ. Bot. 7; 235, 1848. This species has been named after its discoverer, and has not yet been reported from outside the Philippines. My specimen number 8012 differs from the type in being strictly a shrub, 2 m. high; and in having much elongated leaves which are subentire and bear only obscure transverse veins. It thrives on dry grassy slopes and mountains near Baguio at an elevation of 1400 m.

14. F. obscura Blm. Bijd. 474, 1825-6. This common and widely distributed species presents many forms which have been described by various authors as distinct species. My specimen number 8013 collected at Baguio seems to agree well with *King's* diagnosis given in the Ann. Roy. Bot. Gard. Calc. 1; 81, 1887, except in its smaller and coriaceous leaves. It has not previously been reported under this name from the Philippines, though its distribution is given from the lower Himalayan forests of northeastern India through the Khasi Hills, Burma, and the Malayan Peninsula and Archipelago.

15. F. hauili Blco. Fl. Filip. ed. 1; 684, 1837. This is a 5 m. high shrub or often tree like, has a range from the lowlands clear up into the ravines of the pine forests about Baguio at an elevation of 1700 m., and is the most common species of figs in the Philippines. The erect receptacles are much compressed, prominently ridged above the middle, with the shining smooth surface conspicuously spotted with white and turning to a yellowish white when fully mature. Number 8014 is typical, but 8029 I refer here with hesitation. The latter has much smaller receptacles which are more or less clustered; furthermore, they are subglobose and without the prominent ridges. May prove to be a distinct species.

16. F. asperrima Roxb. Fl. Ind. 3; 554, 1832. This species ranges from the low plains to elevations of about 1000 m. on the hills of central and southern India, and in Ceylon; reported to be very distinct and without much variation. It is doubtful whether my specimen is of the typical Indian form, or whether it is confused with *F. cumingii Miq.* Lond. Journ. Bot. 7; 235, 1848: *F. obscura*

Blm. Bijd. 474, 1825-6: or with *F. heterophylla Linn.* Fil. Supp. 442. According to the Ann. Roy. Bot. Gard. Calc. 1; 80, 1887, it cannot be closer to any other species. Number 8030 is a young specimen collected on open grassy hills at Baguio; 8015 was found on a dry ridge near Twin Peaks, bearing soft yellowish rather palatable figs.

17. F. rudis arborea n. var. A tree, widely spreading, 8 m. high. Base of leaves rounded, with obscurely dentate edges; upper surface darker green and finely scurfy, beneath minutely puberulent; leaf petioles as well as the young branches glabrous. Receptacles chiefly below the foliage in the axils of the leaf scars, not at all densely hispid.

Type number 8016 of this variety was discovered in a nearly dry stream bed of the hill country a few miles west of Sablan toward Naguilian. *F. rudis Miq.* Ann. Mus. Bot. Lugd. Bat. 3; 222, 1836-9 has previously been known only from the Celebes and Kei, though a specimen recently collected on Ticao Island, seems to be nearly typical.

18. F. benguetense Merr. Govt. Lab. Publ. 29; 10, 1905. A shrub or a small tree, 4 to 7 m. high; young terminal branches with a short brown pubescence. Leaves lanceolate, 12 to 20 cm. long, 3.5 to 5 cm. wide, entire, acuminate, with a rounded obtuse apex, base merely acute and often somewhat inequilateral, the broader side rounded or obscurely lobed, dark green, glabrous on both sides, beneath pulverulent, submembranous; veins ascendingly curved, prominent, blackish brown, 6 to 8 pairs excluding the 3 to 5 basal ones; petioles 1 to 2 cm. long, sparsely strigose pubescent; stipules acuminate, 5 mm. long, faintly pubescent.

Receptacles often densely clustered in the leaf axils, shining dark green, only sparsely dotted with whitish tubercles, obovoid in outline though somewhat irregular and not perfectly terete, both ends truncate, 1.5 cm. long, nearly that in diameter above the middle, freely bleeding with a molasses like juice; peduncles 4 to 7 mm. in length, slightly pubescent; base of the receptacle subtended by 3 or 4 bracts which are broadly obtuse, 3 mm. long, nearly glabrous, subcoriaceous, soon becoming liberated from the comparatively thin syconium though persistent; gall and male flowers in one set of receptacles, deep red; male flowers in the vicinity of the umbilicus, 2 mm. long, short pedicellate, with 3 brown glabrous united segments which finally become separated and coarsely lacerate at the obtuse apex; filament caudate, thickened; single stamen ultimately exerted, with 1 mm. long dorsally recurved anther; gall flowers 3 mm. long, pedicellate, subtended by a similar 1.5 mm. long perianth; its ovary subglobose or obovoid, shining, with a short rigid subterminal style bearing a disc like stigma.

This shrub or small tree has some resemblances to *F. umbonata Reinw.* in Blm. Bijd. 454, 1825-6, from the Moluccas, but in that species the leaves are coriaceous, adpressed pilose and short petioled; receptacles short pedunculate, scabrous and ebracteate. It is the most common of the figs in ravines and along streams of the pine belt of Benguet Province. Number 8017 was collected at Baguio and as a subalpine species it has a wide range in the mountainous section of northern Luzon.

19. F. elmeri Merr. Govt. Lab. Publ. 29; 9, 1905. A 4 m. high shrub, not numerously branched; bark thick, quite tough, easily peeling; young growing portion of twigs densely pubescent with brown or yellowish white hairs. Leaves clustered toward the ends of the twigs, 7 to 10 cm. long, 5 to 7 cm. wide, inequilateral, ovate or often falcate, base unequally cordate or semisagittate, apex usually acute, margin subentire or only obscurely denticulate, the under surface soft pubescent with yellowish short brown hairs; upper surface somewhat harsh, its sparse pubescence chiefly along the nerves; basal nerves 5 to 7 pairs and terminating in the denticulations; transverse veins numerous and parallel; the areolae brownish yellow; petioles 5 to 8 mm. in length, densely covered with brownish hairs; stipules shorter than the petioles, acuminate, pubescent along its midnerve and margins.

Receptacles mostly below the leaves, solitary upon the naked branches or clustered upon short branchlets, globose or only slightly tapering at the ends, yellowish to a deep red, smooth and containing a dull white gummy substance, 12 to 15 mm. in diameter, suddenly contracted into a peduncle like base 2 to 3 mm. long and subtended by 2 or

3 ciliate margined bracts; peduncle proper of equal length and pubescent; gall and staminate flowers only, pedicellate, 4 mm. long; unbilical scales barely protruding; staminate flowers few, immediately beneath the scales, with only one stamen but often associated with an undeveloped pistil; brown filaments 1.5 mm. long; anther broad, dorsally recurved, caudate, 1 mm. in length; perianth enveloping the stamen, reddish brown, of 3 or 4 subequal acuminate segments; gall flowers with a similar perianth; ovary subglobose or obovoid, 1.5 mm. in diameter; style 1 mm. long, sublateral, bearing an inconspicuous stigma.

Number 8018 was collected in a small ravine amongst the pines directly opposite the hotel Whitmarsh at Baguio, and is a small tree about 4 m. high. It is related to *Miquel's F. semicordata* in Ann. Mus. Bot. Lugd. Bat. 3; 300, 1836–9 of the Celebes, but can be distinguished by its non hispid character, much shorter peduncles, perfectly glabrous receptacles which are not strictly fascicled upon tubercles arranged on the smaller naked branches immediately under the foliage.

20. F. subintegra (Merr.) Elm. *F. elmeri subintegra Merr.* Govt. Lab. Publ. 29; 10, 1905. A tall shrub or small tree, 5 m. high; its branches are spreading, the younger ones reddish brown, wholly glabrous. Leaves 3 to 5 cm. wide, 9 to 12 cm. long, with acute apex, ovate to semifalcate, inequilateral with a pronounced basal lobe from the wider half, margin obscurely denticulate, subcoriaceous, harsh on the upper surface, smooth beneath, dark lucid green and glabrous on both sides; veins very prominent on the under side, 3 to 5 from the base in addition to the 3 to 5 primary pairs, reticulations coarse, irregular; petioles 5 mm. long, glabrous brown; stipules similar in color, equalling the petioles, acute, also glabrous.

Receptacles usually upon twigs immediately below the leaves or frequently in their axils, globose but with a very conspicuous elevated conical umbilicus, 15 mm. in diameter, nearly glabrous, deep brick red and pendulous when mature, the base abruptly constricted into a 2 to 3 mm. long stalk which at its junction to the 3 mm. long peduncle is subtended by 2 or 3 obscure bracts; only staminate and gall flowers, a few hermaphrodite; staminate ones scattered beneath the umbilical scales, pedicellate, 4 mm. long; perianth unequal, brown, of 3 to 4 segments which envelope the single stamen; filament 1 mm. long, brownish; anther caudate, broad and dorsally recurved, 1 mm. in length; gall flowers also pedicellate, similarly surrounded by 4 perianth segments; ovary globose or obovoid, bearing a rather short lateral style which terminates into a subclavate stigma.

This specimen number 8019 was collected in thickets upon limestone outcroppings some few miles north of Baguio in the vicinity of La Trinidad. It is usually a small tree and its red fruits make a pretty contrast below the shining green leaves. It is nearest related to *F. elmeri Merr.* Govt. Lab. Publ. 29; 9, 1905, but can at once be recognized from it by the glabrous character of its leaves and younger twigs, and by the different arrangement of its cross veins. In this species as also in the preceding I have found a few staminate flowers with undeveloped pistils, which character shows a relation to the section *Palaeomorphe*.

V. COVELLIA.

Flowers unisexual; male flowers in the same receptacles as the gall flowers, monandrous, the perianth of 3 or 4 distinct pieces; female flowers in separate receptacles from the males and galls, pedunculate or sessile; the perianth gamophyllous, much shorter than the ovary, or wanting, rarely consisting of 4 or 5 pieces; the receptacles on long subaphyllous branches issuing from near the base of the stem, often subhypogaeal; or on shortened branchlets or tubercles from the stem and larger branches; or axillary; shrubs or trees, never epiphytes or climbers.

21. F. minahassae Miq. Ann. Mus. Bot. Lugd. Bat. 3; 231, 1836-9. This showy tree and most characteristic species of the genus has a general range from the Celebes, its original place of discovery, northward throughout the Philippines. It is never found in abundance, and is chiefly confined to gently sloping ravines and along water courses of the foot hills. The large green hispid leaves cast a solid shade, and are usually subtended by long brown subpersistent bracts; its hanging subaphyllous fruiting branches are sometimes 3 m. long and often so dense as to conceal the trunk; the figs are clustered in globular masses, cuneate in outline, angular in shape and when mature are yellowish red. Specimen number 8020 was collected at Sablan.

22. F. nota (Blco.) Merr. Govt. Lab. Publ. 17; 10, 1904. This is *F. aspera nota Blco.* Fl. Filip. ed. 1; 677, 1837. Quite a common species and probably has a wide distribution throughout the Archipelago. It is usually a tree 8 m. high and inhabits the forests of the hills, but often depauperate forms are found in the low lands. Young receptacles are finely pubescent, becoming smooth with maturity and if exposed to the sun turn to a dark purple. The size of the leaf varies even on the same twigs; some of them are nearly smooth, others are pubescent on both sides, with margins either entire or undulately dentate. Numbers 8031 and 8021 were collected at Sablan; 8032 is from Twin Peaks. It is successfully grown in some of the Manila gardens.

23. F. barnesii Merr. Govt. Lab. Publ. 17; 12, 1904. This Ficus was first collected along the Lamao river, Province of Bataan, Luzon, by *P. T. Barnes* after whom it was named. A tree 7 to 10 m. tall and is usually found on river banks of the hill forests. It can easily be recognized aside from its 1 m. long fruiting branches by the rusty brown young twigs which in their typical form are densely covered with reddish brown hairs. My numbers 8033 from Twin Peaks and 8034 from Sablan are typical; number 8022 from Twin Peaks has not the rusty brown hirsute pubescence, and approaches some forms of *F. nota (Blco.) Merr.* Govt. Lab. Publ. 17; 10, 1904.

24. F. repandifolius n. sp. A small tree, 10 m. high, with rather few spreading branches; bark smooth, grayish white and mottled; young twigs glabrous, brownish, soon turning gray. Leaves dark green, turning to a somber color while drying, persistent only toward the ends of the twigs, the fallen ones leaving large circular scars, glabrous, subchartaceous, 18 to 25 cm. long including the 2 cm. long glabrous petiole, 4 to 7 cm. wide, oblong or broadly lanceolate to lanceolate, apex abruptly terminated into a short acuminate point, base cuneate and commonly with slightly inequilateral sides which are either subentire or coarsely and obscurely repand; veins 5 to 7 pairs, ascendingly curved, faintly anastomosing near the margin, reticulations evident, glabrous and reddish brown, more prominent beneath; bracts of the buds glabrous, sharply acuminate, 1.5 cm. long, those subtending the leaves caducous.

Receptacles clustered upon 1 to 3 cm. long rigidly branched tubercles from the stem and larger branches; peduncle 2 to 3 cm. long, glabrous, slender or perceptibly thickened toward the apex; fruits globose or obovoid, smooth, dark red when mature, about 1.5 cm. in diameter or a trifle less, rounded at the apex, the base abruptly tapering into a short pedicel which is usually subtended by 3 very minute bracts; flowers all dull red; male flowers with a single stamen, few, concealed by the umbilical scales, stipitate; anther nearly 1 mm. in length, surrounded by a perianth; fertile female flowers subsessile or slenderly pedicelled; perianth entire, its apex obliquely truncate, united at the base to the ovary; style short, sublateral.

Type specimen 8037 was discovered in the woods of the higher foothills at Twin Peaks, Province of Benguet, Luzon. A small tree sparingly met in deep shaded woods or forests at 1000 meters.

VI. EUSYCE.

Flowers unisexual, male and gall flowers in one set of receptacles, fertile female flowers usually in a distinct set of receptacles; male flowers with 2 stamens, rarely 1 or 3; receptacles small or often quite larger, axillary; scandent or erect shrubs or small trees, rarely epiphytal; the leaves alternate, softly hairy or glabrous, not scabrous nor hispid.

25. F. macropoda Miq. Lond. Journ. Bot. 7; 442, 1848. This unique species was originally collected by *Cuming* in the Province of Abra, just north of Benguet. Since then it has not been recollected. Only a few trees were discovered at Twin Peaks and specimen number 8023 was secured in the vicinity of Bluffs along the Bued river. It has the size and branching of an apple tree; the figs are rather scattering in the axils of leaves and their scars, slenderly peduncled, densely pubescent, when mature soft in texture and dull purplish red. It is a very distinct species, though nearest related to *F. luzonensis Merr.* Govt. Lab. Publ. 6; 8, 1904.

26. F. ruficaulis Merr. Govt. Lab. Publ. 17; 13, 1904. The type of this was collected by *E. D. Merrill* at Antipolo, Province of Rizal, Luzon. It has since then been collected in various parts of our Archipelago, from Mindanao up to central northern Luzon. In woods of the hill country and especially along streams it grows to be quite a large tree. Can be easily recognized by its large pubescent fruits and by the broad membranous ovate leaves with slightly cordate bases. Number 8035 is an immature specimen; 8044 is nearly mature and its shape is subglobose or somewhat obovoid. Both of these numbers are from Sablan.

27. F. propinqua. Merr. Govt. Lab. Publ. 20; 8, 1905. Scandent, 5 m. high or long, with a tough woody 2 cm. thick stem; bark dark brown, rather rough; branchlets densely covered with long soft yellowish brown hairs. Leaves quite rigid, ovate to oblong, slightly cordate at base, acute at apex, 9 to 14 cm. in width, margins entire, usually with unsymmetrical sides, shining green and glabrous above with sunken veins, beneath pulverulent and fulvous villous along its nerves; all the veins on the under side very prominent, the 3 to 5 ascending primary pairs excluding the 3 to 5 basal ones prominently connected below the slightly recurved margins, transverse ones chiefly parallel; petioles densely fulvous villous, 1.5 to 2.5 cm. long; stipule lanceolate or long acuminate, 3 cm. long, subpersistent, glabrous except along the dorsal midvein, dry, brown, membranous; bud scales brown, villous on its dorsal vein.

Receptacles 1 to 3-clustered in the axils of leaves, subtended by numerous brown persistent papery bracts of unequal lengths and intermixed, hairy, subglobose to obovoid, its base 1 cm. in diameter, almost glabrous, of a rich golden yellow when mature, extending into a 2 to 3 mm. long pedicel which at its insertion upon the subsessile peduncle is marked by a cartilaginous ring; apex deeply and widely depressed, with umbilical scales barely protruding at bottom;

female flowers only on our specimen, slenderly pedicellate, 4 mm. long, subtended by a half united perianth whose 4 obtuse segments are hyaline margined; achene elongate, ellipsoid, pale yellow, compressed, prominently keeled at both ends; style sublateral, slender, 0.5 to 1 mm. long.

This golden yellow fruited and scandent fig species is allied to *F. villosa Blm.* Bijd. 441, 1825-6 and is primarily distinguished from it by its glabrous receptacles which are not ovoid nor umbonate and always more than 6 mm. in diameter; and by its much shorter, non villous ebracteolate peduncles. Number 8025 was discovered in a small ravine of the pine belt one mile north of Baguio near the barrio of Lucban, and was the only climber observed.

VII. NEOMORPHE.

Flowers unisexual; male and gall flowers in one set of receptacles; fertile female flowers with 2 stamens, the perianth inflated, of 3 or 4 membranous pieces; fertile female flowers smaller than the male or gall flowers; receptacles often very large, in fascicles from tubercles on the stem and larger branches; trees, rarely scandent, never epiphytal.

28. F. integrifolia n. sp. A tree 8 m. high, widely branching from near the middle; bark grayish, mottled with white, rather thick and scaling in plates; ultimate branches few and quite rigid. Leaves confined to the ends of the twigs, spreading, obovate to elliptic, varying in size, mostly 10 cm. long and 6 cm. wide, abruptly tapering into a short blunt apex, base acute, cinereous pubescent beneath as well as the younger branchlets, glabrous above, membranous, edges entire or somewhat undulate above the middle; veins of 3 primary pairs including the basal one, ascending, submarginally united above the middle, secondary ones not numerous, also submarginally united below the middle of the leaf; petioles unequal in length, the longer ones 3 cm. long, rufous pubescent, persistent; bud scales acuminate, 1 cm. long, also pubescent.

Receptacles paniculately clustered upon woody 1 to 2 cm. long tubercles from branches of the size of a man's wrist, short obovoid and much compressed, 1 to 2 cm. in diameter, slightly pubescent when young, finally becoming glabrous and when exposed to the sun turn to a purplish red; its base abruptly contracted into a pedunculate stalk, 1 to 3 mm. long and subtended by 3 broadly obtuse cinereous bracts which frequently are unequally inserted; peduncle proper short brown pubescent, 1.5 cm. long; our receptacles contain only male and gall flowers; staminate flowers few, immediately beneath the umbilical scales, 2 mm. long, subsessile, the 2 or 3 stamens enveloped by entire obovate brown membranous segments; filaments dark, cartilaginous, united at the base; anthers caudate, broad, 0.75 mm. in length; gall flowers closely set, 4 mm. long, stoutly pedicellate, subtended by a similar perianth whose 3 or 4 segments finally become lacerate; ovary ellipsoid, or obovoid; style lateral, short but rigid; stigma terminal, disc like, pale yellow, with the infundibuliform apex easily separating from the style.

Type specimen number 8026 was collected near Baguio toward the barrio of La Trinidad. Number 8036 from Sablan is the identical species with immature flowers. It is a good distinct species, although it resembles *F. sycomoroides Miq.* Ann. Mus. Bot. Lugd. Bat. 3; 230, 1836–9 which has hitherto been reported only from Amboina, its place of discovery. The latter species, however, has ovate elliptic leaves with rounded bases; receptacle turbinate, 1 cm. in diameter, marked by 8 vertical rides about the umbilicus and set upon 1 cm. long pedicels.

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LEAFLETS
ON
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2.	A Fascicle of Benguet Figs	A. D. E. Elmer.

LEAFLETS ON PHILIPPINE BOTANY

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ADDITIONAL NEW SPECIES OF RUBIACEAE

BY

A. D. E. ELMER.

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Argostemma quadripetiolata n. sp. Low rupestrine herbs, 1 dm. high or less; stems usually decumbent, several from the base but otherwise unbranched, glabrous. Leaves distichous, dark green above and with few short strigose hairs, much paler beneath and yellowish pulverulent, subsessile, ascendingly arranged, the larger leaves alternatingly opposed by much shorter leaves, 3 to 5 mm. apart, larger blades 8 mm. long and 4 mm. wide, apex obtusely pointed, base acute or obtuse, oblong with somewhat inequilateral sides, only the midvein visible from beneath, smaller blades 3 mm. long; stipule broadly ovate, sharply acute, 1 mm. high, subglabrous. Flowers terminal, 1 to 3-clustered, white, pendulous; calyx tube 1 to 2 cm. in length, sparsely covered with hyaline many jointed hairs or trichomes, yellowish white, funnel shaped, terminated by 4 broadly ovate or acute segments which are thin and subglabrous; corolla rotate, its 4 segments united at the base, membranous, 3 to 5-nerved; segments broadly linear, obtuse at apex, broadest at the base, 6 mm. long, 2 mm. wide, glabrous; stamens 4, erect, connivent and encasing the style; filament 1 mm. long, recurved, brown and much thickened at the base of the anther, finely pubescent along the dorsal edge; anthers 5 mm. in length, free at the base, gradually tapering from near the base to the apex, dehiscing by ventral longitudinal slits; style dark brown, its base broadened, slender, a trifle pubescent, 5 mm. in length, terminated by a flattened bilobed stigma.

Type specimen 7944, A. D. E. Elmer, Mount Banahao, Province of Tayabas, Luzon, April, 1906. Quite common on damp moss covered rock ledges and creek beds in the forests at 1200 meters.

Oldenlandia filifolia n. sp. Slender annual, erect, chiefly branched from the base. Stems and branches striate, cinereously strigose or subglabrous. Leaves opposite, linear or filiform, sessile, 2 cm. long, edges recurved, glabrous above, minutely hirsute below especially along the prominent midvein; stipules united, hyaline, its margins slenderly laciniate. Flowers sessile or short pedicelled, axillary or terminal, in clusters of 1 to 3 and subtended by foliaceous bracts; calyx 3 mm. long, ciliate, the upper 0.3 divided into 4 sharply acuminate recurved segments; tube of corolla hyaline, nerved, pubescent at the throat; segments oblong, obtuse, 1.5 mm. long, ultimately widely spreading; stamens 4, inserted between the segments and upon the throat; filaments glabrous, 1.5 mm. long, outwardly curved; anthers very short, comparatively broad; ovary globose, easily separating from the calyx; style persistent, slender, 3 mm. long, glabrous, the 2 stigmatic arms strongly recurved; mature capsule 2 mm. in diameter, a trifle longer, hispid ciliate, 2-celled.

Type specimen 7956, A. D. E. Elmer, Mount Banahao, Province of Tayabas, Luzon, April, 1906. In open places of rocky soil at the foot of the mountain.

Psychotria subalpina n. sp. A shrub, 3 to 5 m. high; branches smooth, covered with a brown colored bark; wood hard and heavy. Leaves mostly toward the ends of the twigs, 0.5 to 1.5 cm. apart, glabrous, subcoriaceous, oblanceolate, the larger ones 12 cm. long including the 1 to 2 cm. long glabrous petiole, 2 cm. wide, lucid green above, paler beneath, sharply acuminate, base slenderly attenuate; midvein beneath quite prominent, the 10 to 12 ascending lateral nerves faint; stipule connate, narrow and corky, margin densely fringed with fine ferruginous colored hairs; bud scales glabrous, triangularly ovate, terminating into a slender acuminate apex. Infrutescence a corymbose panicle, terminal, much exceeded by the leaves, 3 cm. long, 3 to 5 cm. broad; primary peduncles 3, glabrous, subtended by the uppermost pair of leaves, the 2 lateral ones thinner and a trifle longer; branchlets usually 2 or 3 in the same whorl, subtended by minute glabrous bracts; drupes usually in pairs, sessile, smooth, lemon color when mature, obovoid or subellipsoidal, 1 cm. long, 6 mm. in width, often bearing the persistent basal portion of the calyx; stones 2, flat, narrowly elliptic in outline on the ventral surface or more tapering toward the base, sharply 5-ridged and convex on the dorsal side, plane on the ventral, 7 mm. long, 5 mm. wide; calyx cup shaped, thick and leathery except toward the irregular sinuate or obscurely toothed rim, glabrous on the exterior and on the upper half of the interior; corolla whitish, thick, exceeding the calyx by 2 cm., valvate, inserted upon the middle of the calyx; the 4 yellowish segments about 3 mm. long, 1 mm. wide, the apex terminated by an inwardly curved small abrupt point, glabrous except near the base on the inner surface; stamens 5, included, alternating with the corolla segments; anthers 1 mm. long, oblong; filaments less than 1 mm. long, attached near the base of the corolla; ovary 2-celled, with a large circular obcurely lobed disk; style 2 mm. long, compressed, bilobed at the apex, glabrous, erect; ovules solitary in each cell, attached near the base.

Type specimen 7942, A. D. E. Elmer, Mount Banahao, Province of Tayabas, Luzon, April, 1906. This subalpine undershrub is rather common in the damp region from 1500 to 2000 meters.

Psychotria paloense n. sp. A lax shrub, 2 m. high or less; bark yellowish gray, that on the young shoots short ferruginous pubescent; wood closely grained. Leaves opposite, chiefly toward the ends of the twigs, from 1 to 4 cm. apart, lanceolate to oblanceolate, unequal in size, the larger ones 4 cm. wide, 12 cm. long including the stout 5 mm. long pubescent petiole, apex acute, base cuneate, submembranous, glabrous on the upper surface, short dark brown pubescent on the lower; midvein conspicuous on both sides, the 13 lateral pairs obscure and slightly ascending with their tips barely united; stipule short but broad, with ciliate margins, densely ferruginous pubescent, deciduous, leaving a short dark brown fringed scar. Inflorescence terminal, subcorymbose, much exceeded by the leaves, upon erect 1 to 2 cm. long ferruginous pubescent peduncles; branchlets similarly pubescent, subtended by minute bracts; calyx cupular, 3 mm. long, the 1 mm. deep and entire rim pulverulent or short pubescent, about 2 mm. in diameter; corolla white, turbinate, 6 mm. long, short pubescent or strigose on the exterior, cleft into 5 adnate and tumid obtuse segments, interior of the tube and inner surface of the segments glabrous except at the white villous throat; stamens 5, alternating with the segments and inserted opon the throat; anthers subsessile, 1 mm. long; style included, glabrous, terminated by 2 dilated lobes at the apex which are densely hairy on the ventral side; drupes solitary or usually in pairs, subsessile, 8 mm. in diameter, 10 mm. long, elliptic oblong to subglobose, glabrous, yellow but finally turning to a dark purple; pyrene slightly truncate at the apex, obtuse at the base, 5 mm. across, 7 mm. long. elliptic to oblong, its ventral face plane, the dorsal convex and 3 to 5-ridged.

Type specimen 7056, A. D. E. Elmer, Palo, Leyte, January, 1906. It was discovered in gently sloping wooded ravines, six miles west of Palo, and is not at all common.

Psychotria elliptifolia n. sp. A much branched rather gnarly scandent shrub; branches rigid, brown and smooth; wood very tough. Leaves numerous along the twigs, opposite, 1 to 1.5 cm. apart, elliptic to broadly oblanceolate, 2 cm. wide, 2 to 3 cm. long including the glabrous 4 mm. long petiole, glabrous, equally shining green on both sides, coriaceous, obtuse or acute at apex, acute to cuneate at base, 5 to 7 ascendingly nerved; stipule thin, dry, brown, glabrous, 7 mm. long, fugaceous, apex obtuse or abruptly truncate and terminated by a minute acumen. Inflorescence terminal, congested, ovate in outline, 2 to 3 cm. long, subtended by the uppermost pair of leaves and their stipules; main peduncles glabrous, 3 from the base but with the 2 lateral ones shorter, 5 to 10 mm. long; secondary branchlets subverticellate, subtended by short brown scarious bracts; pedicels 3 mm. long, subtended by very minute bracts or without them, thickened toward the glabrous ovary; flowers creamy white; calyx rim shallowly 5-toothed, glabrous, subpersistent; corolla with a 2 mm. long comparatively broad tube; segments 5, pubescent on the ventral side, acute, 1.5 mm. long, reflexed, 0.75 mm. wide at the base; stamens 5, barely exceeding the throat, alternating with the segments and inserted upon the tube of the corolla 1 mm. from the throat; anthers 0.75 mm. long, broadly ellipsoid; filaments brown, glabrous, 1 mm. in length; style slender, also 1 mm. long and glabrous, thickened toward the apex which bears a 3-lobed yellow stigma.

Type specimen 7943, A. D. E. Elmer, Mount Banahao, Province of Tayabas, Luzon, April, 1906. Bushy and tightly cleaving in the forks of branches of trees and shrubs, inhabiting the wet mossy region at 1600 meters.

Gardenia morindaefolia n. sp. Small tree, 5 m. high; branches thick and rigid, the young apical portion yellowish pulverulent. Leaves shining and darker green on the upper surface, submembranous, glabrous, turning black while drying, opposite, deciduous, more or less grouped toward the ends of the twigs, elliptic to broadly lanceolate, frequently unequally sided and a trifle curved, sharply acuminate, base obtuse or attenuate, very variable in size, the larger ones 7 cm. wide, 19 cm. long including the 2 to 5 cm. long petiole, the midnerve and 8 to 11 pairs of lateral ones dark brown; stipule 6 mm. long, faintly pubescent at the broad base, sharply acute, deciduous, membranous, enclosing a fringe of fine hairs. Infrutescence terminal, upon short few branched cymes; pedicels stout, 1 to 2 cm. long; fruit bearing a persistent short calyx tube, 2.5 cm. in diameter, 3 cm. in length, 1-celled; pericarp 2 mm. thick, the placenta like partition very thin; seeds about 30, much compressed, triangular or rectangular or half circular, 7 mm. in diameter, black.

Type specimen 7959, A. D. E. Elmer, Mount Banahao, Province of Tayabas, Luzon, April, 1906. Evidently rare and only observed on exposed ridges on the seacoast side towards the town of Tayabas.

Ophiorrhiza pubescens n. sp. Low suberect or decumbent annual herbs, 5 to 10 cm. high; stems usually solitary and unbranched, 3 mm. thick, densely covered with a short dirty brown or yellowish gray pubescence. Leaves opposite, the lower ones upon 1 cm. long densely pubescent petioles, the upper ones subsessile, bristly pubescent on both sides but especially on the nerves beneath, green above, paler below, very unequal in size, the larger ones 4 cm. long without the petiole, 2.5 cm. wide above the middle, apex acute or obtuse, base obtuse or truncate to subcordate and often slightly inequilateral, ovate lanceolate to elliptic oblanceolate or oblong; lateral nerves 11 to 13 pairs in the larger blades, ascendingly curved; stipule small and obscure, hispidly pubescent. Inflorescence terminating the stems, broadly corymbose or subcircinately branched; flowers short pedicelled or sessile, subtended by narrow foliaceously tipped ciliate bracts; calyx densely brown hispid pubescent, its 5 short acute teeth 4 mm. long including the tube; corolla yellowish white, 4 mm. long with the triangularly acute 1 mm. long segments, ciliate brown pubescent on the outside, soft pubescent on the interior at about the middle; stamens included, inserted upon the corolla tube 1 mm. from the base; anthers linear, 1 to 1.5 mm. long; filaments slender, glabrous, 1 to 2 mm. long; style 1 mm. in length, also glabrous; stigma clavate, subentire or cleft.

Type specimen 7941, A. D. E. Elmer, Mount Banahao, Province of Tayabas, Luzon, April, 1906. Discovered in red heavy soil of open grass lands.

Ixora meyeri n. sp. Shrub or a small tree, 5 m. high; ultimate branches densely pubescent. Leaves opposite, very thin and membranous, soft yellowish pubescent on both sides but especially dense on the nerves beneath, 6 cm. wide, 18 cm. long including the 1 to 2 cm. long pubescent petiole, smaller ones lanceolate, larger ones broadly oblanceolate, apex sharply acuminate, base attenuate, nerves 7 to 9 pairs; stipule 15 mm. long, densely pubescent, broad at the base but abruptly tapering into a slender filiform bristle. Inflorescence terminal, corymbose, much shorter than the leaves; peduncles and branchlets densely yellowish brown pubescent, subtended by hairy setose bracts; flowers white;

subsessily 5 to 7-clustered at the ends of the peduncles; calyx bristly hairy, the united portion very short; segments longer than the tube, 2 mm. long, about 7 in number, sharply acuminate, densely covered with soft bristle like hairs; corolla pubescent on the exterior, 2 cm. long, divided into 5 strap like segments, its throat minutely pubescent; stamens 5, inserted upon the throat of the corolla; filament short, flattened, glabrous; anthers 8 mm. long, linear, pointed at the apex, sagittate at the base; the included portion of the style pubescent, entire or cleft at the apex.

Type specimen 7958, A. D. E. Elmer, Mount Banahao, Province of Tayabas, Luzon, April, 1906. A lax shrub of the subalpine forest region. Rare.

Ixora leytensis n. sp. Lax but sparingly branched shrub, 3. m. high; bark dull gray, that on the young twigs pulverulent; wood soft and easily breaking. Leaves opposite, 8 cm. apart, membranous, glabrous above, puberulent or minutely pubescent beneath, oblong or elliptic, 7 to 9 cm. wide, 24 cm. long including the stout 2 cm. long petiole, obtuse or acute at apex, acute at the base; midvein and the 13 to 15 lateral pairs prominent beneath, reticulations and anastomosing tips quite conspicuous; stipule deciduous, connate, rigid, brown, 2 mm. wide, abruptly terminating into a slender setaceous point. Terminal inflorescence upon a 4 to 7 cm. long straight peduncle which is usually subtended by larger or smaller foliaceous bracts, ovoid in shape, 3 to 5 cm. across, the branchlets and pedicels subtended by small sharply acuminate bracts; calyx subglabrous or finely pubescent, 5 mm. long, its thick and entire rim 1.5 mm. deep and persistent in fruit; corolla flesh colored, 14 mm. long, its tube finely pubescent on the exterior, 2 mm. in diameter at the base and gradually enlarging towards the limb; the 5 lobes oval, about 4 mm. long, thick, apex truncately rounded, imbricate, the inwardly overlapping side with an auriculate appendage at the base; stamens sessily inserted upon the corolla throat and alternating with the segments; anthers 3 mm. long, truncate at base or in the fully matured ones bilobed, acute at apex, introrse; style equalling the corolla, straight, sparsely strigose or subglabrous, terminated by 2 thick lanceolate or triangularly acute 3 mm. long stigmatic arms; drupe subsessile or upon 3 mm. long pedicels, subglobose but with the lateral sides a trifle broader, 10 mm. long, 8 mm. across the widest portion, glabrous, reddish, 2-celled, 1-seeded in each; pyrene circular, 6 mm. in diameter, 4.5 mm. thick, plane on the ventral side, convex on the dorsal, smooth and with rounded edges, centrally attached.

Type specimen 7044, A. D. E. Elmer, Palo, Leyte, January, 1906. A rare species found in a ravine three miles west of Palo, near the rapids of Boñgon River.

Tricalysia purpureum n. sp. A lax and slender shrub, 3 m. high; branches also slender, glabrous. Leaves when mature somewhat purplish along the 8 to 10 pairs of nerves and on the reticulations, glabrous on both sides, subcoriaceous, rounded or obtuse at base, long acuminate, lanceolate, the larger ones 4 cm. wide and 12 cm. long including the 4 cm. long petiole; stipule glabrous, sharply acuminate, 5 mm. in length, chartaceous. Flowers few or many in bracteate cymes, upon ascending axillary peduncles which are glabrous and 3.5 cm. long; bracts subtending the branchlets and flowers persistent, short but sharply pointed; pedicels 3 to 5 mm. long, at the base subtended by a 2 to 3-segmented calyculus; calyx glabrous, turbinate, 2.5 mm. long, obscurely 5-toothed; corolla a trifle longer than 2 mm., wholly glabrous, united at the base; the 5 leathery segments not twisted, imbricate, spoon shaped, obtuse at apex; stamens 5, sessily inserted upon the corolla near the base; anthers 1 mm. long, obtuse apex, base truncate or sagittate; style very short, bearing 2 rather broadly flattened stigmatic arms; capsule purple red when mature, 2-celled, glabrous, subglobose, about 8 mm. in diameter, without calyx segments, its pericarp very thin; seeds usually 4 in each cell, 8 mm. long, angularly flattened, oblong, curved, slightly twisted, overlapping, brownish red, the surface longitudinally covered with strands.

Type specimen 7666 ~~7959,~~ A. D. E. Elmer, Mount Banahao, Province of Tayabas, Luzon, April, 1906. Quite rare in the lower foothills. An undershrub of the woods or forests.

Urophyllum banahaense n. sp. A small tree like shrub, 5 to 8 m. high; branches few and divaricate; younger bark thin, glabrous, yellowish gray; wood white, soft. Leaves opposite, 2 to 5 cm. apart, oblong to elliptic oblong, 4 to 6 cm. wide, 1.5 to 2 dm. long including the glabrous 3 to 5 cm. long petiole, apex acute, base also acute or cuneate, subcoriaceous, shining dark green above, lighter beneath, wholly glabrous; primary nerves 7 to 9 pairs, ascendingly curved, not conspicuous, the midvein very prominent especially beneath; stipule leathery, about 1 mm. wide, fimbriate along the margin, deciduous. Flowers usually solitary from the axils of the leaves or the leaf scars; peduncle slender, glabrous, 12 mm. long, gradually enlarging toward the smooth ovary, arising from a very short corky tubercle; calyx with a 3 mm. deep entire cupular rim; corolla 1.5 cm. long, slightly united at the base; segments 5, valvate, fleshy, oblong lanceolate, acute, about 4 mm. wide, glabrous without, the inner surface covered with a matrix of woolly hairs except near the base; the 5 stamens included, alternating with the petals and inserted near the base of the united corolla; anthers 3 mm. long, broadest across the auriculately bilobed base; filaments half as long, glabrous, membranously margined; style thick, 5 mm. long, finely pubescent; stigmas 5, subterete, 5 mm. long and 1 mm. in diameter; ovary 5-celled, numerously ovuled, arranged along parietal placentae; berry glabrous, obovoid, 8 mm. long, 6 mm. in diameter.

Type specimen 7946, A. D. E. Elmer, Mount Banahao, Province of Tayabas, Luzon, April, 1906. Quite common in well shaded places at 1000 meters of the forest region.

Urophyllum lucbanense n. sp. Erect shrub, 3 to 5 m. high; branches lax, covered with a smooth yellowish white bark, the younger twigs olivaceous pubescent. Leaves membranous, in opposite pairs, 2 to 3 cm. apart, acute at apex, obtuse or rounded at base, oblong to elliptic lanceolate. 2 to 4 cm. wide, the larger ones 10 cm. long including the 1 cm. long yellowish pubescent petioles, pubescent beneath especially along the nerves, glabrous above except the midvein; lateral veins 7 to 11 pairs, prominent beneath, strongly arched toward the apex. Flowers 1 to 3 subsessily clustered in the leaf axils or in the axils of the scars, subtended by 3 to 5 small acute bracts densely covered with short pale hairs; rim of the mature calyx 1 mm. deep and truncate, pubescent and shallowly 4-toothed in the young state; corolla segments 4, thick, valvate, at most 2 mm. long, triangularly acute, slightly united at the base, pubescent on both sides with an additional fringe of longer hairs around the basal interior portion; stamens alternating with the corolla segments and inserted upon them near the base; filaments glabrous, 1 mm. long or less, extended beyond the anthers as acute flattened triangular appendages; anthers 1 mm. long, oblong, attached to the filaments along its egdes and on the ventral side; style tumid, 1 mm. long, glabrous; stigmas short, clavately 5-lobed; berries globose, 7 mm. in diameter, pulverulent and with a crisp pubescence, 5-celled, numerously ovuled upon central placentae.

Type specimen 7945, A. D. E. Elmer, Mount Banahao, Province of Tayabas, Luzon, April, 1906. This undershrub is chiefly confined along water courses of the woods at 800 meters. Quite rare.

Timonius arborea n. sp. Tree, 8 to 12 m. high. Leaves opposite, easily separating, leaving broad oval scars, the larger ones 15 cm. long, 6 cm. wide, oblanceolate, apex acute and frequently tipped, base narrowed down to the very short petiole, with 5 to 7 pairs of nerves which are prominent beneath, glabrous on both sides, paler green beneath; stipules 4 mm. long, acuminate, yellowish pubescent. Flowers axillary, solitary upon 1.5 cm. long yellowish pubescent pedicels, subtended by 2 acute bracts; calyx 6 mm. long, the ovary portion cinereous, the short tubular limb with yellow hairs, faintly 5 or 6-apiculate; corolla cinereously pubescent on the exterior, 13 mm. long, divided into 6 leathery ultimately reflexed segments; stamens 6, sessile, inserted upon the corolla tube at about the middle; anthers 3 mm. long, base truncate, apex apiculate, dorsally attached; filaments flattened, adnate to the corolla tube; style equalling the throat, subglabrous, fluted, the upper half twisted and becoming separated into 5 or 6 linear stigmas; ovules imbedded in a pulpy mass, clustered in 6 groups of 8 or 10 in each; fruit globose, numerously costate on the exterior, glabrous, 1 cm. in diameter; seeds stony, light yellow, subterete, curved, 7 mm. long, the central ones nearly straight and gradually thickened toward the base.

Type specimen 7960, A. D. E. Elmer, Mount Banahao, Province of Tayabas, Luzon, April, 1906. Inhabiting the woods at 500 meters. Also my number 7049 from Palo, Leyte.

Lasianthus morus n. sp. A finely branched 3 m. high shrub; branches slender, covered with smooth bark; wood solid. Leaves opposite, 4 to 7 cm. apart, submembranous, lanceolate, apex slenderly acuminate, base acute or cuneate, 2 to 3 cm. wide, 1 to 1.5 dm. long including the 5 mm. long pubescent petiole, margins entire or subrugose, glabrous on the upper side, short olivaceous pubescent on the reticulations and nerves beneath; all the nerves prominent beneath, the 7 to 9 lateral pairs strongly ascendingly curved, reticulations parallel and at right angle with the midvein; stipule short pubescent, 3 to 4 mm. long, sharply acuminate. Flowers white, mostly 1 to 3-clustered in the lower leaf axils or in the axils of their scars, arising from very short scaly and pubescent tubercles; calyx 3 to 4 mm. long, olivaceous pubescent, the upper half perceptibly enlarged, its rim 4-apiculate; corolla 8 mm. long, half divided into 4 segments, short pubescent except at the basal interior; segments oblong, obtuse at the apex and terminated by a short deflexed hairy appendage from the ventral apical side; stamens 4, alternating with the segments and inserted upon the hairy throat; anther 1.5 mm. long, linear; filament glabrous, brown, 0.5 mm. long; style included, erect, subglabrous, gradually thickening toward the apex; berries coal black when mature, without odor, brown pubescent in the young state but soon becoming glabrous, ellipsoid, 4 to 5 mm. in diameter, 7 mm. in length, with the persistent calyx rim; ovary 4-celled, 1-seeded in each; stone 1 mm. in thickness, 4 mm. long, subterete or obscurely 3-sided, black, rugose.

Type specimen 7050, A. D. E. Elmer, Palo, Leyte, January, 1906. An undershrub of wooded ravines along the Bañgon River.

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LEAFLETS
ON
PHILIPPINE BOTANY

PANDANS OF EAST LEYTE

BY

A. D. E. ELMER

SUBSCRIPTION PRICE 2 CENTS PER PAGE.

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EDITED BY A. D. E. ELMER, A. M.

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PANDANS OF EAST LEYTE

BY

A. D. E. ELMER.

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Pandanus radicans Blco. Fl. Filip. 1; 780, 1837: ed. 2; 537, 1845. *Miq.* Fl. Ind. Bat. 3; 166, 1859. *F. Vil.* Nov. App. 285; 1880-3. *Warb.* in *Engler* Pplanzenr. 3 Heft, IV. 9; 85, 1900. *Merr.* Govt. Lab. Publ. 17; 8, 1904: Govt. Lab. Pub. 27; 89, 1905. It is quite impossible to identify our specimen from the original diagnosis, and consequently most reliable authors considered it as an imperfectly known species. However, all through east Leyte the Visayans know this form of pandan as Olañgo which is the name *Blanco* gives. I therefore restore *P. radicans Blco.* with the additional description made from fresh material.

This species is usually found growing in small groups of three to seven trees, in alluvial overflows along rivers and in marshes of caladium and other subaquatic plants. The straight erect trunks are anchored to the soil by prop roots and are about 8 m. high and 2 dm. in diameter; the old bark is smooth and shining, though in the younger plants it is conspicuously ring like and beset with stout conical spines; branches few, thick, very short. Leaves crowded upon the ends of the rigid branches, usually in four spirally twisted rows (an arrangement to secure the greatest amount of sunlight), antrorsely serrate along the edges, less so along the median line beneath, apex acute, largest ones 6 m. long and 12 cm. wide, the upper one third usually drooping. Infrutescence upon a strong recurved 5 dm. long stalk; receptacle with a pine apple odor, triangular, pendulous, in the early stages subtended by bracts; mature syncarpia dark brick red, 6 to 10 in a cluster, ovoid, the terminal ones usually smaller, about 8 cm. in diamter and 14 cm. long; drupes smooth, 100 or more, its obscure angles rounded, 12 mm. in diameter, 2.5 cm. in length, the upper one third free and conically rounded to a comparatively small truncate apex which bears from 5 to 7 wart like stigmas.

This species is represented by my number 7200, collected at Palo, Leyte, January, 1906.

Pandanus paloensis n. sp. Erect shrubs, 2 to 3 m. high, solitary or frequently in small groups of three from the same root. Stems 3 to 5 cm. in diameter, with short prop roots, branched above the middle; branches slender, ascending, rather numerous and frequently rebranched; bark grayish brown, ring like, beset with pointed conical spines, otherwise smooth. Leaves numerously crowded towards the ends of the ultimate branches, 4 to 7 dm. long, 2 cm. wide, the apex acuminate, sharply serrate along the edges, midrib of the younger leaves retrorsely serrate below the middle and antrorsely toothed toward the apex, upper surface and towards the apex set with distant antrorse teeth, nearly all the leaves gracefully recurved. Infrutescence terminal, erect upon a triangular 3 to 5 cm. long stalk; syncarpia without odor, 6 to 10 in a cluster, sessile, ascending, rather closely set, each subtended by a thin marcescent bract the lowest one of which is much the longest and equalling the infrutescence, 2.5 to 4.5 cm. long, 2 to 3 cm. in diameter, triangularly ovoid; receptacle lanceoloid, less than one third the diameter of the entire syncarpium; drupes shining strawberry red when mature, closely set, about 200, angular or more or less compressed, the angles of the upper one fourth free portion terminating in a rounded or subtruncate apex bearing a brown disk like stigma, about 6 mm. long, 4 mm. wide above the middle, 1-celled.

Type specimen 7343, *A. D. E. Elmer*, Palo, Leyte, January, 1906. It is the most common of the pandans in this region, growing everywhere in the shrubby forests of the low hill country and in the barringtonian formation near the seacoast and along the larger rivers. It usually stands singly and never forms thickets. Because of its convenient size, slender stems and branches, and graceful palm like leaves it is often used for decoration purposes. In Visayan it is called Aras-as· It is most nearly related to *P. polycephyllus Lam.* but can be recognized by its shorter leaves, more slender branches, and by its triangularly ovoid syncarpia. The latter is a strand plant of the Moluccas and apparently has a different habit. *P. paloensis Elm.* is more distantly related to *P. whitfordii Merr.* from which it is at once distinguished by its much wider leaves; much larger, more numerous and differently shaped syncarpia; and with four times the number of drupes.

Pandanus muricatus n. sp. An erect or ascending shrub, about 3 or 4 m. high, usually forming small dense copses. Trunks sparingly branched from the base, usually provided with few and short prop roots; bark smooth, brown, ring like, beset with short blunt spines; uppermost branches comparatively short, ascending and rigid. Leaves 2 m. long, 5 cm. wide, crowded in rows from the ends of the branches, shining green above, striate and paler beneath, the basal half ascending, the terminal portion gradually recurved, sharply serrate, midrib beneath keeled and finely toothed, the lateral median lines above and towards the slenderly acuminate apex distantly beset with small erect conical spines. Infrutescence without odor, terminal, subpendulous upon a 1 m. long triangular peduncle, bearing 3 to 5 distantly arranged syncarpia each subtended by a 10 cm. long bract; syncarpium descending, sessile, 15 cm. long, 7 cm. in diameter, cylindric or subtriangular, equally rounded at both ends, frequently a trifle thicker between the middle and the apex, pale lemon color on the shaded side, its sunny side turning to a pleasing red; receptacle triangular, persistent, one third the thickness of the syncarpium; drupes very numerous and compactly set, 23 mm. long including the spinescent apical cap, 5 mm. in diameter across the middle, compressed or obscurely angled, surrounded by a sticky yellow pulp; apex of drupes conical, terminating into a sharp muricate blackish spine which is usually somewhat curved toward the apex of the syncarpium; in fully matured fruits these loosen and fall off in plates prior to the falling of the stones which are apparently 2-celled but only 1-seeded.

Type specimen number 7201, *A. D. E. Elmer*, collected in alluvial soil along the Bañgon River, near Palo, Leyte, January, 1906. The fibers of its leaves are not as brittle as those in *P. radicans Blco.*, and for this reason it is the chief source of padan material for making coarse bags, mats and baskets. It is related to *P. copelandii Merr.* from Negros but distinctly different in the longer slenderly acuminate leaves;and much longer peduncles bearing longer and differently shaped syncarpia. The Visayan call it Barieu.

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LEAFLETS
ON
PHILIPPINE BOTANY

A NEW POLYPODIUM AND TWO VARIETIES

BY

E. B. COPELAND

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A NEW POLYPODIUM AND TWO VARIETIES

BY

E. B. COPELAND

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Polypodium (Phymatodes) monstrosum Copel. n. sp. Rhizomate scandente, 2 mm. crasso, paleis squarrosis atromurinis 5 mm. longis lanceolatis acuminatis basibus peltatis vestitis; stipitibus 5 - 10 mm. altis, nudis, articulatis; frondibus 30 - 50 cm. altis, 4 - 7 cm. vel ultra latis, utrinque sensim angustatis acuminatis, margine diversa aut grosse crenata aut lobata aut lobis medialibus valde protractis, glabris, subcoriaceis; costa infra acuta, supra sursum biangulata; venis primariis conspicuis, fere ad marginem attingentibus, nigris, venulis transversalibus inconspicuis plus minus 6 connexis, venatione ultima occulta, laxa; soris crebris irregulariter sparsis.

Luzon, ad montem Banajao. *Elmer* 7174.

P. monstrosum var. leucophlebium Copel. n. var. A typo frondibus plerumque angustioribus et integrioribus, venis infra albidis diversum.

Luzon, Laguna, Pagsanjan. *Copeland* 2069.

P. monstrosum var. integriore Copel. n. var. Marginibus crenato-sinuatis, aliter vix a praecedente diversum.

Luzon, Lepanto, Bagnen, 2000 m. s. m. *Copeland* 1964.

Unquestionably a relative of *P. musaefolium Bl.* suggesting also *P. zippelii Bl.*, different from *P. anomalum Christ* in having small sori and a very short stipe. I treat the irregular, apparently monstrous form as the type of the species, since it seems the more common, and well established.

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LEAFLETS
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NEW PANDANACEAE FROM MT. BANAHAO

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NEW PANDANACEAE FROM MT. BANAHAO

BY

A. D. E. ELMER.

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Freycinetia monocephala n. sp. A delicate and profusely branched shrub, climbing trees and undershrubs; branches slender, many, 3 to 5 mm. in diameter, covered with a smooth brown bark, the ultimate branches usually drooping and bearing scattered leaves. Blades thin, very numerous, glabrous on both sides, 5 to 9 cm. long, 2 to 4 mm. wide across the middle or just below the middle, the basal portion conspicuously narrowed and usually somewhat recurved, margins entire, apex slenderly tapering to a fine point; sheath present on the younger blades, thinly scarious, 3 to 5 mm. long, margins sparsely ciliate. Infrutescence terminal, erect, solitary; peduncle 1 cm. long, straight, slender and glabrous, subterete, arising from a short thickened gnarly triangular terminal portion of the twig, subtended by foliage leaves; drupes not numerous nor compact, 8 mm. long, 4 mm. in diameter across the middle, usually 4-ridged, not compressed, equally tapering toward both ends, the immature ones united below the middle or from a trifle above this but soon becoming separated, yellowish red when mature; cone small, pyramidal, 3 to 5 but usually 4-angled, bearing at its truncate apex 2, 3, 4 or 5 stigmas.

Type specimen 7380, *A. D. E. Elmer*, Mount Banahao, Province of Tayabas, Luzon, May, 1906. It inhabits the foothills at 700 meters, and usually is met in very damp and deeply shaded places. All plants observed bare single heads. Easily recognized by its numerous, thin and short grass like leaves.

Pandanus banahaensis n. sp. A round toped tree 15 m. high or higher with more or less scaling bark covered with mosses and lichens; spines conical, blunt and short; stems usually short, never longer than the upper one third, about 3 dm. in diameter; branches numerous, widely spreading, forming an umbrella shaped crown 7 or more meters in diameter; prop roots single or the larger ones branched, various in size and length, the larger ones as thick as a man's body, never less than two thirds the heigth from the ground to the branches but frequently extending from the latter clear to the ground. Leaves densely crowded toward the ends of the branches and casting almost a solid shade, not at all arranged in spirally twisted rows, shining green above, with a glaucous shade beneath, mostly recurved or subpendulous when old, 2 to 3 m. long, 8 to 12 cm. wide, somewhat narrowed toward the base, apex acute, 1 dm. below the apex 5 cm. wide; the keel of the midvein beneath smooth below the middle, finely but distantly serrate toward the apex, the margins sharply serrate from base to apex, the teeth near the base stout and rather distant, those toward the apex fine and numerous; lateral median lines on the upper surface toward the apex sharply apiculate. Syncarpium solitary upon a recurved 6 dm. long triangular peduncle, composed of hard closely set drupes, 20 cm. long, 15 cm. in diameter, ovoid; drupes about 100, tapering from the base to the truncate apex, 4 to 5 cm. long, 3 cm. in diameter above the middle or narrower in the smaller ones, the upper 1 cm. free and smooth, obtusely and irregularly 5 to 7-angled, yellowish red when mature; locules 5 to 7, stout, conical or irregularly pyramidal, the central ones frequently smaller, about 5 mm. high, each terminated by a single sessile 1 mm. in diameter brown stigma.

Type specimen 7378, *A. D. E. Elmer*, Mount Banahao, Province of Tayabas, Luzon, May, 1906. This species is the largest of pandans known to occur in the Philippines. In this region it is strictly confined to gulches and ravines, and ranges from 700 to 1200 meters in the forests.

Pandanus utilissimus n. sp. Tree, 4 to 6 m. high, forming small groups in dry ground and dense forests in swampy places. Stems solitary, short branched toward the top, with only a few short and thick prop roots, erect, 15 or more cm. in diameter; bark grayish, not smooth and shining, its rings obscure; spines short, blunt, conical; branches few, sometimes several, erect or ascending, short and thick, usually somewhat constricted at the place of attachment and slightly thickened immediately above this. Leaves shining green or semiglaucous beneath, densely clustered on the ends of the branches, the larger ones 5 m. long, 2 dm. wide; the central or younger ones erect or ascending, with only their tips descending, apex acuminate, sharply spinescent along the edges, the keeled dorsal line antrorsely serrate below the apex, the lateral ventral lines similarly serrate towards the apex; old leaves densely clustered, usually drooping from the middle, thick and rigid at the base, with a 6 cm. deep ventral groove near the base, persistent, splitting and wearing to shreds from the apex, the bases ultimately reduced to narcescent sheaths giving the stem or branches a thickened shaggy appearance especially when inhabited by epiphytic herbs. Peduncle single, 1 to 2 m. long, hanging, stout, triangular, more or less thickened at the distal end; syncarpium green and glaucous, solitary, pendulous, 6 dm. long, 2 dm. in diameter, round or somewhat obscurely angular, ellipsoid, equally rounded at both ends, solid and about 25 or more kilograms in weight, having the appearance of a jack fruit, (*Artocarpus integrifolius Linn.*); receptacle triangular, scaly, 4 to 7.5 cm. across its thickest portion; drupes 4.5 to 7 cm. long, slenderly tapering from the pointed base to the crown which is 1 cm. in diameter, its angles irregular and blunt, the sides semiviscid and deep red except towards the base which has a tinge of yellow; apical cones 1 cm. high, 5 to 7-sided, blunt, with faint concentric rings, glaucous green until maturity when a slight tinge of red is visible, terminating into a very hard and shining green downwardly curved point which bears a single large brown stigmatic disk.

Type specimen 7379, *A. D. E. Elmer*, Mount Banahao near Lucban, Province of Tayabas, Luzon, May, 1906. The maturing of the drupes is gradual from apex to base of the syncarpium, the drupes falling to the ground soon after loosening. It takes some time before all the drupes of a single fruit are shed, and in a fruiting grove of trees all stages can be found during the month of May. The lustrous red surfaces of the ripe drupes give a very pretty effect from beneath, while the sides of the fruit as a whole can hardly be recognized from the color of the foliage. The fully matured syncarpia have a peculiar faint odor, quite similar to that of the sweet vernal grass of the United States. This pandan is very common along ravines and in swampy places in the barrio districts of Majayjay, Magdalena, Cavinte, Louisiana and San Antonio of Laguna Province, Luzon, and also extends into other adjoining provinces where similar conditions prevail. It has a distinct altitudinal range from about 300 to 700 m. or the beginning of a subalpine shrubbery vegetation mixed with forest trees. Again, its abundance is confined to gulches and ravines in the hill country of open meadows. The leaves are extensively used in weaving mats, bags, baskets and even coarse hats. The natives call it "Pandan Totoo," the true or tame pandan. The entire older leaves are gathered and cut into as long lengths as possible. Then they are sliced into strips 1 cm. in width (or often into wider or narrower strips according to what the material will be used for) with a knife set in on a curved bamboo guide called "Pañglinas." These strips are tied up in small bundles and usually placed in the sun to dry. Just before weaving they are made pliable by a machine called "Ilohan." This is kept on the ground floor and is composed of a heavy horizontally placed wooden shaft about 3 m. long—each end resting upon solid erect standards 1 m. high; one end of this shaft is fixed stationary to one of the standards, the other end has a handle and can roll back and forth upon the flattened upper surface of the second standard. The strips are pressed between this rolling end of the shaft and the smooth hard surface of the standard. Usually between the standards and around the lower half of the shaft are tied heavy stones to make the operation more effective.

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LEAFLETS
OF
PHILIPPINE BOTANY

MANUAL OF THE PHILIPPINE COMPOSITAE

BY

A. D. E. ELMER

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6. New Pandanaceae from Mt. Banahao	A. D. E. Elmer.

ERRATA.

Tribe IV. *Inuleae* p. 104 should follow tribe III. *Astereae* p. 125; and tribe V. *Heliantheae* p. 157 should follow tribe IV. *Inuleae*.

LEAFLETS OF PHILIPPINE BOTANY

EDITED BY A. D. E. ELMER, A. M.

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MANUAL OF THE PHILIPPINE COMPOSITAE *

BY

A. D. E. ELMER.

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INTRODUCTION.

In this article an effort has been made to include all reported Compositae of the Philippine Islands. It includes eleven tribes, sixty genera and one hundred species. Of the seven following genera we have had no specimens on hand for verification. *Epaltes*, *Zinnia*, *Enhydra*, *Blainvillea*, *Dahlia*, *Carthamus* and *Porophyllum*. The genus *Tridax* and one or two additional tropical genera have not yet been reported but can reasonably be expected to occur in the Philippines. Keys for the tribes, genera and species are given. The bibliography for each species is complete as far as the Philippines is concerned, otherwise only the most important publications are cited. Nearly all the specimens in the herbarium of the Bureau of Science are enumerated, and the types of the new species described are deposited in it.

This family is by far the largest, one of the most distinctly natural and the most universally distributed of all Phaenogamous plants. Our most eminent synantherologists record about 1,000 genera containing over 12,000 species, or one tenth of all known Phaenogams. This vast number of species is distinguished more or less by minor characters, but there is no species over which there can be any doubt as to its family. The dry seed achene with or without pappus is common to all. The origin and history of this family is obscure, but there is a general opinion that it represents the most highly developed group in the vegetable kingdom. The great diversity of localized forms tends to indicate a very remote origin, although our first reliable fossil records belong to the Miocene period of the Tertiary era. However, it must be remembered that most of the species are herbaceous and none aquatic—conditions not favorable to permanent preservation. Economically the family ranks extremely low in its direct usefulness to man. In fact a great many of its species are troublesome weeds, rapidly spreading through unintentional introductions. None of them afford green or dry feed, despite the fact that most of them are herbaceous. Nor do we find among them trees large enough for lumbering. A number of species yield seeds that are used as foods and from which certain oils are extracted. Young foliage of many species and varieties is used in salads, and the tuber of a few is edible. Quite a variety is grown for ornamental purposes. Some are cultivated for their coloring material, and many have medicinal properties.

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* This article was prepared in the Bureau of Science of the Philippine Government, Manila, P. I., and is here published with the consent of the director.

FAMILY CHARACTERS.

Herbs or shrubs, rarely trees, with watery, resinous or milky sap, and alternate or basal, rarely opposite or whorled entire, lobed or pinnatifid simple or compound leaves; stipules none. Flowers perfect, pistillate or neutral, or sometimes monecious or dioecious, borne on a common receptacle, forming heads, subtended by an involucre of few to many bracts arranged in one or more series. Receptacle naked, or with chaffy scales subtending the flowers, smooth or variously pitted. Calyx tube completely adnate to the ovary, the limb (pappus) of bristles, awns, teeth, scales, or crown like, or cup like, or wanting. Corolla of two forms, the first tubular or campanulate, 4 to 5-lobed; the lobes valvate and with marginal nerves; the second ligulate, the lobes elongate and connate into a strap shaped or elliptic ligule. Stamens 4 to 5, inserted within the corolla tube; filaments usually free; anthers basifixed, usually connate; connective produced upwards; cells simple or tailed at the base; pollen subglobose, rough. Ovary 1-celled; style slender, bifid; arms (sometimes connate) linear, subterete, naked or externally pubescent or tipped by pubescent cones, margins stigmatic; ovule solitary, basal, erect, anatropous; nucleous with one coat. Fruit an achene, dry, indehiscent. Seed erect, its testa membranous; albumen none; embryo straight; cotyledons plano convex.

KEYS FOR THE TRIBES.

Flowers not all ligulate.
  Perfect flowers with regular corollas.
    Stigmatic lines at the base of the stigma or below the middle.
      Stigmas filiform or subulate, hispidulous.

I. VERNONIEAE.

      Stigmas more or less clavate, papillose puberulent.

II. EUPATORIEAE.

    Stigmatic lines extending to the tip of the stigma or to the appendages.
      Anthers without elongated appendages at the tip.
        Anther sacs tailed at the base.

IV. INULEAE.

        Anther sacs not tailed at the base.
          Receptacle naked.
            Bracts of involucre well imbricated.
              Stigmas of the perfect flowers with terminal appendages.

III. ASTEREAE.

              Stigmas of the perfect flowers with truncate or hairy or papillose tips.
                Bracts of the involucre herbaceous.

VI. HELENIEAE.

Bracts of the involucre dry and scarious.

VII. ANTHEMIDEAE.

Bracts of the involucre little if at all imbricated, except when the broad outer ones overlap the inner.

VIII. SENECIONEAE.

Receptacle chaffy.

V. HELIANTHEAE.

Anther with elongated, cartilaginous mostly connate appendages at the tip.

IX. CYNAREAE.

Perfect flowers, or all, with bilabiate or unequally segmented corollas.

X. MUTISIEAE.

Flowers all ligulate.

XI. CICHORIEAE.

I. VERNONIEAE.

Leaves usually alternate. Flowers never yellow. Heads with the flowers all similar and tubular. Anthers cleft at the base. Style arms subulate, hairy.

Heads distinct, many flowered.

Achenes 4 to 5-angled; pappus none.

1. ETHULIA.

Achenes 8-ribbed; pappus short, fugacious.

2. CENTHRATHERUM.

Achenes 10-ribbed; pappus long, copious.

3. VERNONIA.

Heads one or few flowered, crowded into dense masses.

4. ELEPHANTOPHUS.

1. ETHULIA LINN.

Branched herbs with alternate serrate leaves, and small homogamous corymbose heads. Involucre subcampanulate; bracts many seriate, imbricate; receptacle flat, naked; corollas all tubular, equal, slender, regular, the limb campanulate, the lobes narrow; anthers obtusely auricled; style arms subulate; achenes glandular between the 4 to 6 prominent ribs; pappus none.

Species 2; one in Java and the following:

1. E. conyzoides Linn. Sp. Pl. ed. 2; 1171, 1762-63. *DC.* Prod. 5; 12, 1836. *Miq.* Fl. Ind. Bat. 2; 8, 1856. *Hook.* Fl. Brit. Ind. 3; 227, 1881.—An erect glabrous or puberulous leafy annual, with narrowly or broadly elliptic to lanceolate, acuminate, glandular dotted serrate leaves, and numerous short or long peduncled heads, the flowers purplish or reddish. Leaves 5 to 12 cm. long, narrowed and entire at the base, acute or short acuminate, rather coarsely serrate. Heads about 6 mm. long, many flowered.

This species is here reported for the first time from the Philippines and was discovered near the summit of Mount Santo Tomas at an approximate altitude of 2500 meters.

DISTRIBUTION:

Sunda Archipelago. Africa, Madagascar and India.

LUZON:

Mount Santo Tomas, Province of Benguet, June 1904, *Elmer* 6560.

2. CENTHRATHERUM CASS.

Erect or diffusely branched herbs, rarely shrubby, with alternate and petioled toothed leaves, and usually solitary, medium sized homogamous heads. Involucre subhemispheric; bracts many seriate, the inner dry or scarious, the outer herbaceous, often leafy; receptacle flat, naked or pitted; corollas all tubular, equal, slender, the limb campanulate, the lobes 5, rather narrow; anthers obtusely auricled; style arms subulate; achenes obtuse, 8 to 10-ribbed; pappus short, scabrid, fugacious.

Species about 13; mostly of tropical Asia, one in Australia and a few in tropical America.

1. C. fruticosum Vid. Rev. Pl. Vasc. Filip. 159, 1886. *Ceron* Cat. Pl. Herb. 100, 1892.—An erect suffrutescent plant 1 m. high, with striate puberulent branches, subsessile rhomboid to obovate oblong leaves. The heads long pedunculate, solitary, about 2 cm. in diameter. Leaves acute at both ends, about 2 cm. long, 1 cm. wide, serrate or crenately dentate, yellowish or ashy tomentose beneath. Flowers blue; the external bracts foliaceous, longer than the head, the inner scarious; corolla about 1 cm. long; achenes 2.5 mm. long, oblong, the ribs brown, not prominent; pappus bristles about equaling the achene.

Bentham Fl. Austr. 3; 460, 1886 in a note following *Centratherum muticum Less.* states. "We have apparently the same from the Philippine Islands", but cites no specimens. Undoubtedly he based this statement on *Cuming* 1556 which number is enumerated by *Vidal* Phan. Cuming Filip. 121, 1885 as an undetermined species of *Centratherum*. Probably *Cuming's* plant is identical with *Vidal's* species which may prove only a form of *Centratherum muticum Less.*, a species distributed in Australia and tropical America generally. Our plant is common in limestone formations of middle northern Luzon and is the only woody species in the genus.

LUZON:

Baguio, Province of Benguet, March 1904, *Elmer* 5956.

3. VERNONIA SCHREB.

Herbs, shrubs, climbers or small trees, with alternate leaves and terminal or axilliary, solitary cymose or panicled homogamous heads. Involucre ovoid, globose or hemispheric, equaling or shorter than the flowers, the bracts many seriate, the inner ones longest; receptacle naked or pitted, sometimes with short hairs; corollas all equal, tubular, slender, the 5 lobes narrow; anther bases obtuse; style arms subulate; achenes striate, ribbed or angled, rarely terete; pappus of many hairs, often with a row of outer short hairs or flattened bristles.

Species about 450; chiefly tropical American.

Large shrubs or small trees.
  Heads 32-flowered.

1. V. philippinensis.

  Heads 5 to 6-flowered.
    Leaves glabrous.

2. V. arborea.

    Leaves pubescent beneath.

3. V. vidalii.

Trailing or subscandent shrubs.
  Heads 5-flowered.

4. V. lenticellata.

  Heads 20-flowered.

5. V. cuneata.

Herbs.
  Divaricately branched; campanulate heads 1 cm. in diameter.

6. V. chinensis.

  Slender herbs; subcylindric heads less than 1 cm. across.
    Perennial; leaves linear.

7. V. vialis.

    Annual; leaves ovate to lanceolate.

8. V. cinerea.

1. V. philippinensis Rolfe in Journ. Linn. Soc. Bot. 21; 312, 1884. *Vid.* Rev. Pl. Vasc. Filip. 160, 1886: Phan. Cuming. Filip. 121, 1885.—A shrub or small tree, with ferruginous tomentose, striate and terete branches. Leaves elliptical to oblong, acuminate, petiolate, the base cuneate, the upper surface puberulous the lower surface tomentose. Panicle terminal, ample; heads pedunculate, about 32-flowered; involucre globose, the scales ovate, the inner ones oblong, obtuse; achenes pubescent, 10-striate; the pappus hairs brown, twice as long as the involucre.

An endemic species based on 1092 *Cuming* from the Province of Albay, Luzon, of which we have seen no specimens. This species has been confused with *V. cumingiana Benth.*, Fl. Hongk. 169, 1869, a species of British India and Hongkong, but which does not extend to the Philippines.

2. **V. arborea Ham.** Trans. Linn. Soc. 14; 218, 1824. *DC.* Prod. 5; 22, 1836. *Vid.* Rev. Pl. Vasc. Filip. 159, 1886: Cat. Pl. Prov. Manila, 34, 1880: Sinop. Atlas, t. 58. f. A. 1883. *Ceron* Cat. Pl. Herb. 100, 1892. *Hook.* Fl. Brit. Ind. 3; 239, 1881. *F. Vil.* Nov. App. 114, 1880. *K. and V.* Bijd. Boomsoort. Java 5; 50, 1900. *V. javanica Llanos*, Mem. Ac. Cienc. Madrid, 1858 non *DC. Mart.* in Nuov. Giorn. Bot. Ital. 15; 286, 1883. *King and Gamb.* Mat. Fl. Malay. Penin. 16; 26, 1905.—A small tree with somewhat pubescent or nearly glabrous branches and corymbs, and elliptic ovate, acuminate, glabrous or slightly pubescent leaves, the heads 1 to 6-flowered in usually large leafless terminal panicles. Leaves 7 to 20 cm. long, 3 to 7 cm. wide, glandular and glabrous or slightly puberulous, beneath glabrous and shining above except the puberulous midrib, the base acute or somewhat obtuse. Panicles 20 cm. long or less; heads with pappus 1 cm. long, the flower pale purple. Bracts oblong, obtuse, small, imbricate in several series, the outer ones shorter than the inner. Corolla glabrous. Achenes about 2 mm. long, compressed, obscurely 8 to 10-ribbed; pappus white or yellowish, persistent, the hairs all equal.

Our plants from Mount Mariveles inhabit exposed ridges at an altitude of about 1300 meters, and bear small glabrous leaves.

DISTRIBUTION:

Java and Borneo.

LUZON:

Mount Mariveles, Province of Bataan, October 1903, *Merrill* 3200.

Mount Mariveles, Province of Bataan, November 1904, *Elmer* 6695.

Laguimanoc, Province of Tayabas, September 1903, Forestry Bureau 13, collected by *Ware*.

3. V. vidalii Merr. Govt. Lab. Publ. 6; 6, 1904. *V. arborea vestita Vid.* Rev. Pl. Vasc. Filip. 160, 1886 non *V. vestita Baker.*—A small tree 10 m. high or less, with elliptical ovate, acuminate or merely acute leaves which are very densely white or buff velvety pubescent beneath, darker, glabrous and shining above, and ample terminal panicle; the axis and branches densely pubescent like the under surface of the leaves. Leaves 9 to 15 cm. long, 3 to 5 cm. wide, the nerves prominent beneath, about 10 pairs, the petioles densely velvety pubescent, 1.5 to 2.5 cm. long. Heads including the pappus about 8 mm. long, the flowers pale purple, 5 or 6 in each head; scales of the involucre imbricate in several series, the inner longer and glabrous or somewhat pubescent; achenes sparingly strigose, 1.5 mm. long.

An endemic species, most closely related to *V. arborea Ham.*, but sufficiently distinct.

LUZON:

Kias, Province of Benguet, June 1904, *Elmer* 6607.

Bagabag, Province of Nueva Viscaya, June 1902, *Merrill* 153.

Lamao River, Province of Bataan, July 1905, Forestry Bureau 1278.

Tanay, Province of Rizal, May 1903, *Merrill* 2291.

San Mateo, May 1904, Forestry Bureau 1128.

4. V. lenticellata n. sp. A woody climber; branches alternate; bark of the older ones dark brown and densely set with raised lenticels; flowering twigs pubescent with brown hairs. Leaves alternate, ascending, lanceolate, equally acuminate at both ends, subcoriaceous, glabrous above, lighter colored and puberulent beneath, 7 cm. in length, 2 cm. in width across the middle, primary as well as the lateral nerves prominent beneath. Inflorescence thyrsoid, 1 to 2 dm. long; branches rigidly ascending, short pubescent with brownish yellow hairs; heads not numerous but clustered toward the ends of the peduncles, 1 cm. long, only half that in diameter, cylindrical; involucral bracts easily separating, imbricate, coriaceous, in several series, the lower ones short and acute, the upper ones linear lanceolate to oblanceolate, apex pubescent, acute or obtuse, margins finely pubescent; flowers all alike, tubular, pink, never more than 5-flowered; corolla 8 mm. long, tubular or in the immature state fusiform, divided nearly half way down into 5 rather straight acuminate segments; stamens barely exceeding the corolla; anthers 3 mm. long, linear, apex hyaline and acute, base strongly sagittate but not tailed; slender filaments 1 mm. long, inserted upon the tube below the middle; pappus dense, scabrous, dark yellowish brown, intermixed with a few shorter basal ones; achene obovoid to cuneate, glandular and sparsely strigose, obscurely 10-costate.

Type specimen 6564, *A. D. E. Elmer*, collected near the summit of Mount Santo Tomas, Province of Benguet, Luzon, June, 1904. This species is closely related to *V. scandens DC.*, but is never more than 5-flowered; the achenes are not compressed and only obscurely ribbed while the pappus is not at all red. Straggling or subscandent at 2500 meters. Rare. Recently also collected on Mount Banahao.

5. V. cuneata Less. in Linnaea 644, 1831. *F. Vil.* Nov. App. 114, 1880. *Decaneurum cuneata DC.* Prod. 5; 67, 1836. *Miq.* Fl. Ind. Bat. 2; 21, 1856.—A scandent shrub, with the ultimate branches puberulous and dark brown. Leaves alternate, coriaceous, glabrous on both sides, the revolute margins entire or apiculate, lanceolate to oblanceolate, acute or obtuse, the base cuneate, with a 5 mm. long petiole, paler beneath, reticulately nerved. Infrutescence terminal and subterminal; heads campanulate, 7 mm. in diameter, 1.5 cm. in length including only the pappus, usually 3 to 7 paniculately clustered; peduncles 1 to 2 cm. long, short brown pubescent, tumid and minutely bracteate toward the apex; involucre many seriate, campanulate but ultimately spreading, persistent; bracts acute, subcoriaceous, puberulent and pubescent, the inner ones linear, 1 mm. wide; receptacle glabrous, brown except at the place where the achene is attached; achene subterete or slightly angled, sparsely pubescent, 8 to 10-costate gradually tapering from the base to the apex, 4 mm. in length, 1 mm. in diameter, the outer ones usually curved, base with a straw colored knob, apex with a blackish truncate point, about 20 to 30 in each head; pappus equal, reddish brown, subpersistent, 8 mm. long, minutely scabrous. much spreading in the mature state.

This distinct species of the Moluccas is reported by *Villar* from the island of Balabac.

6. V. chinensis (Linn.) Less. Linnaea, 6; 105, 1831. *Miq.* Fl. Ind. Bat. 2; 18, 1856. *Benth.* Fl. Hongk. 169, 1861. *F. Vil.* Nov. App. 113, 1880. *Hook.* Fl. Brit. Ind. 3; 235, 1881. *Vid.* Phan. Cuming. Filip. 121, 1885: Rev. Pl. Vasc. Filip. 160, 1886. *Forbes and Hemsl.* in Journ. Linn. Soc. Bot. 23; 401, 1888. *Hayata* in Journ. Coll. Sci. Tokyo, 18; Art. 8, 4, 1904. *King and Gamb.* Mat. Fl. Malay. Penin. 16; 26, 1905. *Cyanopsis pubescens DC.* Prod. 5; 69, 1836. *Serratula multiflora Blco.* Fl. Filip. ed. 1; 617, 1837. *Conyza chinensis Linn.* Sp. Pl. 1208, 1753.—An erect annual, divaricately branched herb, 1 m. high or less, puberulous or tomentose, the branches slender, the leaves sessile or petioled, the pale purple flowers in 20 to 30-flowered heads. Leaves ovate elliptic to elliptic lanceolate, 2 to 7 cm. long, usually obtuse and minutely apiculate, membranous, pale and densely tomentose beneath. Heads many flowered, subglobose, the bracts pubescent, lanceolate, acuminately awned; receptacle pitted; corolla glabrous; achenes 4 to 5-ribbed, glabrous or glandular, about 2 mm. long, the pappus white.

DISTRIBUTION:

India, Malayan Peninsula, China and Japan.

LUZON:

Manila, January 1904, *Elmer* 5514.

Atimonan, Province of Tayabas, August 1904. *Whitford* 666.

Mount Mariveles, Province of Bataan, April 1904. *Whitford.*

Los Baños, Province of Laguna, 1903, *Hallier.*

PARAGUA:

E-wi-ig River, February 1903, *Merrill* 703.

PANAY:

January 1904, *Copeland* 117.

7. V. vialis DC. Prod. 5; 25, 1836. *Miq.* Fl. Ind. Bat. 2; 12, 1856.—A slender, erect, branched perennial, 30 to 50 cm. high, with long peduncled heads, and linear, more or less cinereous pubescent leaves. Stems and branches pubescent or puberulous. Leaves 1.5 to 3 cm. long, 4 mm. wide or less, entire, obtuse, sessile or nearly so. Heads about 5 mm. long, the bracts of the involucre lanceolate, acuminate, pubescent; achenes striate, pubescent, about 1 mm. long; the pappus white, 4 mm. long.

This species grows in open grass lands of the pine region at 1600 meters. It was originally described from specimens collected in Madagascar, and was later reported from Java by *Miquel.* Our specimens do not agree well with *De Candolle's* diagnosis, and if distinct I propose the name *V. benguetensis.*

LUZON:

Baguio, Province of Benguet, June 1904, *Elmer* 6584.

Bagabag, Province of Nueva Viscaya, June 1902, *Merrill* 159.

8. V. cinerea (Linn.) Less. Linnaea, 4; 291, 1829. *DC.* Prod. 5; 24, 1836. *Miq.* Fl. Ind. Bat. 2; 11, 1856. *Benth.* Fl. Hongk. 169, 1861: Fl. Austr. 3; 459 1866: *F. Vil.* Nov. App. 113, 1880. *Naves* in Blco. Fl. Filip. ed. 3; t. 280, 1880. *Hook.* Fl. Brit. Ind. 3; 233, 1881. *Mart.* in Nuov. Giorn. Bot. Ital. 15; 286, 1883. *Vid.* Phan. Cuming. Filip. 160, 1886: Rev. Pl. Vasc. Filip. 160, 1886. *Forbes and Hemsl.* in Journ. Linn. Soc. Bot. 23; 401, 1888. *Hayata* in Journ. Coll. Sci. Tokyo, 18; Art. 8, 5, 1904. *King and Gamb.* Mat. Fl. Malay. Penin. 16; 27, 1905. *Conyza cinerea Linn.* Sp. Pl. 862, 1753. *Vernonia cinerea rotundifolia* (*Willd.*) *Walp.* Nov. Act. Nat. Cur. 19; Suppl. 1; 253, 1843.—A slender, erect, branched, herbaceous, usually hoary pubescent annual, 15 to 35 cm. high. Leaves mostly 2 to 4 cm. long, 1 to 1.5 cm. wide, petioled, ovate to ovate lanceolate, obtuse or acute, subentire or toothed. Heads small, about 20-flowered, in loose corymbs; flowers purplish, the bracts of the involucre linear or lanceolate pubescent, the tips acuminately awned; achenes about 1 mm. long, pubescent; pappus about 3 mm. long, the outer hairs very short.

Distribution:

Africa, tropical Asia, Japan and Australia.

Luzon:

Manila, October 1903, *Merrill* 3472.
Manila, April 1902, *Merrill* 16.
Lucena, Province of Tayabas, August 1904, *Whitford* 609.
Bacolor, Province of Pampanga, May 1904, *Parker* 6.

Mindanao:

Province of Davao, April 1902, *DeVore and Hoover* 204 and 268.

DOUBTFUL AND EXCLUDED SPECIES.

Vernonia andersoni Clarke. Reported by *Villar* Nov. App. 114, 1880. This species should be excluded, as pointed out by *Rolfe* in Journ. Linn. Soc. Bot. 21; 312, 1884. *V. andersoni Clarke*, is a synonym of V. *cumingiana Benth.* a species based on material from Hongkong, having been named by *Bentham* on the erroneous assumption that the Hongkong material was identical with specimens collected in the Philippines by *Cuming.*

Vernonia pectiniformis DC. This British Indian species is credited to the Philippines by *Villar* Nov. App. 113, 1880, who states that he saw a living specimen on Mount Maquiling, Province of Laguna, Luzon. He undoubtedly observed a form of *V. arborea Ham.* It should be excluded from the Philippine flora at least for the present.

Vernonia eupatorioides Blm. This Javanese species is credited to the Philippines by *Villar* Nov. App. 113, 1880, and should also be excluded, since it is not definitely known to occur in our Archipelago.

4. ELEPHANTOPHUS LINN.

Rigid perennial herbs with basal or alternate leaves, the heads axillary or terminal, 2 to 5-flowered. Involucre compressed, its chaffy bracts chiefly imbricated in 2 series, the bracts of the glomerules foliaceous; corolla nearly regular, 5-lobed; style arms subulate; achenes 10-ribbed; pappus persistent, of awn like scales or bristles.

Species 16; one in Senegambia, the others in warmer parts of America.

Heads sessile.

1. E. spicatus.

Heads pedunculate.

Leaves usually whorled at the base.

2. E. scaber.

Leaves not whorled, scattered, subradical or cauline.

3. E. mollis.

1. E. spicatus (Cass.) Juss. in Aubl. Pl. Guian. 2; 808, 1775. *F. Vil.* Nov. App. 114, 1880. *Vid.* Phan. Cuming. Filip. 121, 1885: Rev. Pl. Vasc. Filip. 160, 1886. *Schum. u. Lautr.* Fl. Deutsch. Schutz. Suds. 595, 1901. *Merr.* Govt. Lab. Publ. 6; 22, 1904. *Hayata* in Journ. Coll. Sci. Tokyo, 18; Art. 8, 6, 1904. *Distreptus spicatus Cass.* in *DC.* Prod. 5; 87, 1836. *E. dubius Blco.* Fl. Filip. ed. 2; 442, 1845. *Ageratum quadriflorum Blco.* Fl. Filip. ed. 1; 624, 1837.—An erect, glabrous or sparsely pubescent herb, usually branched from the base. Leaves sessile, oblanceolate, much tapering towards the base, the upper ones numerous, smaller and bract like. Heads subcylindrical, 1 to 3, shorter than the subtending bracts, the bracts themselves smooth, coriaceous; corolla slender, tubular, white; achenes densely hispid, two of the pappus bristles stout, looped at the apex, the others much shorter and finer.

DISTRIBUTION:

Tropical America and in Japan.

LUZON:

Manila, December 1902, *Merrill* 630.

Dinalupihan, Province of Bataan, January 1903, *Merrill* 1577.

MINDORO:

Calapan, January 1903, *Merrill* 1278.

MINDANAO:

Davao, March 1904, *Copeland* 572.

2. E. scaber Linn. Sp. Pl. 614, 1755. *DC*. Prod. 5; 86, 1836. *Blco*. Fl. Filip. ed. 1; 634, 1837: ed. 2, 441, 1845. *Miq*. Fl. Ind. Bat. 2; 21, 1856. *Benth*. Fl. Hongk. 170, 1861: Fl. Austr. 3; 461, 1866. *F. Vil*. Nov. App. 114, 1880. *Hook*. Fl. Brit. Ind 3; 242, 1881. *Mart*. in Nuov. Giorn. Bot. Ital. 15; 287, 1883. *Vid*. Phan. Cuming. Filip. 121, 1885: Rev. Pl. Vasc. Filip. 160, 1886. *Forbes and Hemsl*. in Journ. Linn. Soc. Bot. 23; 402, 1888. *Hayata* in Journ. Coll. Sci. Tokyo, 18; Art. 8, 6, 1904. *King and Gamb*. Mat. Fl. Malay. Penin. 16; 28, 1905.—A stout dichotomously branched herb, the stems and branches rigid, bearing few much reduced leaves, the basal leaves spreading, forming a rosette, the radical leaves obovate to oblong, strigose, obtuse, irregularly crenate. Heads broad, subtended by broad cordate and leaf like bracts; involucral bracts strigose, acute; corolla white to pale violet; achenes scabrid; pappus bristles slender, uniform.

DISTRIBUTION:

Tropical America and Asia, Africa, Australia and Japan.

LUZON:

Bauang, Province of Union, February 1904, *Elmer* 5556.

Dinalupihan, Province of Bataan, February 1903, *Merrill* 1553.

Pagbilao, Province of Tayabas, April 1903, *Merrill* 1962.

Antipolo, Province of Rizal, February 1903, *Merrill* 1295.

MINDORO:

Calapan, January 1903, *Merrill* 1265.

3. E. mollis H. B. K. Nov. Gen. et Sp. Pl. 4; 26, 1820. *DC*. Prod. 5; 86, 1836. *F. Vil*. Nov. App. 114, 1880. *E. serrata Blco*. Fl. Filip. ed. 1; 635, 1837. —An erect herb with large scattered cauline leaves, widely branching above the middle. Stems and slender peduncles covered with fine, rather long, yellowish hairs. Leaves mostly below the middle of the stem, not forming a rosette, alternate, scattered, lanceolate, crenately toothed, acute.

Heads, flowers and achenes similar to the preceding species, but the involucral bracts setaceously acuminate.

DISTRIBUTION:

Tropical America.

LUZON:

Mount Mariveles, Province of Bataan, April 1904, *Whitford*.

Bauang, Province of Union, February 1904, *Elmer* 5574.

Malicboi River, Province of Tayabas, April 1903, *Merrill* 2441.

CULION:

December 1902, *Merrill* 567.

MINDANAO:

April 1903, *DeVore and Hoover* 140.

II. EUPATORIEAE.

Leaves opposite or alternate. Heads with flowers all similar and tubular. Corolla rarely orange, never yellow. Anthers subentire at the base, truncate at apex. Style arms obtuse, papillose.

Anther tip truncate.
5. ADENOSTEMMA.
Anther tip appendiculate.
  Pappus paleaceous.
6. AGERATUM.
  Pappus of slender hairs; involucral bracts numerous.
7. EUPATORIUM.
  Pappus of slender hairs; involucral bracts 4.
8. MIKANIA.

5. ADENOSTEMMA FORST.

Glandular pubescent herbs, erect or reclining. Leaves opposite. Inflorescence terminal, corymbosely paniculate; involucre campanulate, herbaceous, glabrous; receptacle flat, naked; corolla blue, short; anthers truncate, glandular tipped;

style arms elongated, dilated above; achenes glandular, 3 to 5-ribbed.

Species 6; all confined to America except ours which is a cosmopolitan of the tropics.

1. A. viscosa Forst. Char. Gen. 89, 1772-5; *DC.* Prod. 5; 111, 1836. *Miq.* Fl. Ind. Bat. 2; 23, 1856. *Benth.* Fl. Hongk. 171, 1861: Fl. Austr. 3; 462, 1866. *F. Vil.* Nov. App. 114, 1880. *Hook.* Fl. Brit. Ind. 3; 242, 1881. *Mart.* in Nuov. Giorn. Bot. Ital. 15; 287, 1883. *Vid.* Phan. Cuming. Filip. 121, 1885: Rev. Pl. Vasc. Filip. 160, 1886. *Forbes and Hemsl* in Journ. Linn. Soc. Bot. 23; 403, 1888. *Hayata* in Journ. Coll. Sci. Tokyo, 18; Art. 8, 6, 1904. *King and Gamb.* Mat. Fl. Malay. Penin. 16; 28, 1905.—A variable species with large membranous, nearly glabrous ovate leaves, which are usually 3-nerved from near the base, and crenately toothed. Heads on slender peduncles; involucral bracts linear, often somewhat connate; corolla lobes short, pubescent; achenes glandular tuberculate; pappus hairs 3, clavate.

DISTRIBUTION:

Tropical America and Asia, Africa, Australia and Japan

LUZON:

Baguio, Province of Benguet, March 1904, *Elmer* 6010.

Lamao River, Province of Bataan, January 1904, *Merrill* 3774.

Province of Zambales, January 1904, *Hallier.*

CULION:

December 1902, *Merrill* 533.

6. AGERATUM LINN.

Erect herbs, with opposite leaves, and corymbosely paniculate and homogamous heads. Involucre campanulate; receptacle flat or nearly so with or without caducous scales; corolla regularly 5-lobed; anthers appendaged; style arms elongated; achenes 5-angled.

Species 30; chiefly American.

1. A. conyzoides Linn. Sp. Pl. 839, 1753. *DC.* Prod. 5; 108, 1836. *Miq.* Fl. Ind. Bat. 2; 23, 1856. *Benth.* Fl. Hongk. 171, 1861: Fl. Austr. 3; 462, 1866. *F. Vil.* Nov. App. 114, 1880. *Naves* in Fl. Filip. ed. 3; 368, 1880. *Hook.* Fl. Brit. Ind. 3; 243, 1881. *Mart.* in Nuov. Giorn. Bot. Ital. 15; 288, 1883. *Forbes and Hemsl.* in Journ. Linn. Soc. Bot. 23; 403, 1888. *Ceron* Cat. Pl. Herb. 101, 1892. *Merr.* Govt. Lab. Publ. 6; 22, 1904. *Hayata* in Journ. Coll. Sci. Tokyo, 18; Art. 8, 7, 1904. *King and Gamb.* Mat. Fl. Malay. Penin. 16; 29, 1905. *Knautia sagittata Blco.* Fl. Filip. ed. 1; 54, 1837.—A much branched slender annual, the larger leaves often petioled, membranous, cinereous or more often glabrous, crenately toothed, ovate; involucral bracts numerous, dry, subequal, sharply acuminate; flowers small, pale blue or nearly white; mature achenes black; pappus persistent, bristle like above the middle, paleaceous below.

DISTRIBUTION:

Widely distributed over all warm regions.

LUZON:

Bauang, Province of Union, February 1904, *Elmer* 5520 and 5646.

Lamao River, Province of Bataan, April 1904, *Whitford.*

Dinalupihan, Province of Bataan, February 1904, *Merrill* 1560.

Lamao River, Province of Bataan, September 1904, *Borden.*

Atimonan, Province of Tayabas, August 1904, *McGregory* 16.

Pagbilao, April 1903, *Merrill* 1955.

Province of Benguet, January 1903, *Merrill* 1170.

CULION:

December 1902, *Merrill* 363.

PANAY:

Iloilo, January 1904, *Copeland.*

MINDANAO:

Davao, April 1903, *De Vore and Hoover* 262.

7. EUPATORIUM LINN.

Herbs or shrubs, with opposite or alternate leaves and homogamous corymbose heads. Involucre ovoid, its bracts imbricated in 2 or more series; receptacle convex, naked; corollas all equal, slender, 5-lobed; anthers appendiculate at the apex; achenes 5-angled, truncate; pappus copious, capillary.

Species about 400; chiefly American, five or six occur in Europe and Asia and two in Africa.

Herbaceous.

1. E. lindleyanum.

Shrubby.

Leaves ovate, cordate at the base.

2. E. toppingianum.

Leaves lanceolate, obtuse at the base.

3. E. sambucifolium.

1. A. lindleyanum DC. Prod. 5; 180, 1836. *Benth.* Fl. Hongk. 172, 1861. *F. Vil.* Nov. App. 114, 1880. *Vid.* Phan. Cuming. Filip. 121, 1885: Rev. Pl. Vasc. Filip. 161, 1886. *Forbes and Hemsl.* in Journ. Linn. Soc. Bot. 23; 404, 1888. *Hayata* in Journ. Coll. Sci. Tokyo, 18; Art. 8, 9, 1904. *E. reevesii Wall.* in *F. Vil.* Nov. App. 114, 1880.—An erect or subscandent perennial herb, with opposite, sessile, lanceolate, coarsely dentate, glabrous or only sparsely pubescent leaves, which are 3-nerved from near the base. Heads corymbose, the peduncles short, pubescent; bracts subglabrous, acute; achenes glabrous, black; pappus copious, yellowish white.

Distribution:

Manchuria, Japan, China and Australia.

Philippines:

1836-41, *Cuming* 1349.

Luzon:

Dupax, Province of Nueva Vizcaya, May 1902, *Merrill* 225.

2. E. toppingianum n. sp. A subscandent shrub; stems branching toward the top, spreading, forming more or less dense mats; branches opposite, the younger ones covered with a reddish brown short but dense pubescence, terminated by broad corymbs. Leaves also opposite, the lower ones larger and subtending the branches, ovate, less than 8 cm. in length and 4 cm. in width, apex acute, base usually cordate or often only rounded, crenately toothed, 3 to 5-nerved from the base, the lower side short rufous brown pubescent, the upper surface less so and somewhat harsher; petiole usually 1 cm. long, densely rufous pubescent. Peduncles and pedicels of the inflorescence divaricate, subtended by pubescent scale like bracts, densely pubescent; heads glomerate, short pedicelled or subsessile, turbinate, 5 mm. long; bracts of the involucre scarious, straw colored, loosely spreading when mature, about 8 in number, linear lanceolate, 3-nerved, obtuse, very unequal in length, the lower ones rather thick and covered with a brown pubescence, the upper ones smooth and thinly margined; flowers 5, perfect and fertile, 2 cm. long including the slender arms; corolla funnel shaped, 4 mm. long, slightly inflated at the base, bearing short obtuse segments; the 5 stamens included; anthers 1.5 mm. long, linear, truncate at the base, bearing a hyaline triangularly obtuse apex; distinct filament thread like, inserted upon the middle of the corolla tube; style glabrous, base broadened, 8 mm. long, cleft clear to the middle; its arms narrowly ligulate, recurved, stigmatic upon the ventral faces; black achene 3 mm. in length, cylindrical or more tapering toward the base, 5-angled, the angles and the intervening sides sparsely tubercled; pappus 4 mm. long, numerous, yellowish white, obscurely scabrid, united at the base into a coma.

Type specimen 139, *D. Leroy Topping*, Baguio, Province of Benguet, Luzon, January to February, 1903. Closely related to *E. sambucifolium Elm.* from Mount Santo Tomas of the same province. Along trails and in small low shrubberies of the pine region at 1700 meters. Named after *Mr. Topping* who collected in addition to ferns, a number of other interesting Philippine plants.

3. E. sambucifolium n. sp. A subscandant or creeping shrub; young branches soft, rubiginous pubescent, opposite or solitary by abortion. Leaves opposite, uppermost bract like, 6 to 9 cm. long, 1.5 to 2.5 cm. wide, lanceolate in outline or narrowly ovate to oblong, crenately serrate except at the rounded base and along the acuminate apex, short brown pubescent on both surfaces but especially on its lower lighter colored side; petiole 1 cm. long, similarly pubescent. Inflorescence terminal, paniculately corymbose, its lower branches from the axils of the upper leaves; peduncles divaricate and branched above the middle; pedicels rather short, as well as the peduncles subtended by dense rusty pubescent bracts; heads turbinate, 5 mm. long, usually 6-flowered, rather dense and approximate; involucral bracts 10, unequal, mostly glabrous except along the median line, obscurely 1 to 3-nerved, acute, brownish yellow, loosely spreading when mature; flower 6 mm. in length; corolla 4 mm. long, slenderly tapering from the base, terminating into 5 acuminate segments; the 5 stamens included; anthers linear, 2 mm. long, apex hyaline and obtuse, base truncate; filaments shorter than the anthers, separately inserted on the corolla tube below the middle, usually clavate immediately beneath the anthers; style barely exerting the corolla, cleft to below the middle; stigma lobes little compressed, papillose nearly to the base, the sides as well as the 5 angles sparsely tubercled; pappus ample, 3 mm. long, scabrous, yellowish white.

Type specimen 6535, *A. D. E. Elmer*, near the summit of Mount Santo Tomas, Province of Benguet, Luzon, June, 1904.

DOUBTFUL AND EXCLUDED SPECIES.

Eupatorium ayapana Vent. and *E. luzonensis Llanos* are synonyms of the Mexican *E. triplinerve Vent.* Reported to become extinct in our Archipelago.

8. MIKANIA WILLD.

Shrubs or twining herbs with opposite leaves, and spicate, racemose or paniculate inflorescence. Involucre turbinate, its, 4 bracts in one series, but often with a smaller outer series; corolla all equal, with a 5-toothed campanulate limb; achenes truncate, angled; pappus copious often connate at the base.

Species about 50; all American but one.

1. M. scandens (Linn.) Willd. Sp. Pl. 3; 1743, 1800. *DC.* Prod. 5; 199, 1836. *F. Vil.* Nov. App. 114, 1880. *Vid.* Cat. Pl. Prov. Manila, 34. 1880. *Mart.* in Nuov. Giorn. Bot. Ital. 15; 288, 1883. *Hook.* Fl. Brit. Ind. 3; 244, 1881. *Vid.* Phan. Cuming. Filip. 121, 1885: Rev. Pl. Vasc. Filip. 161, 1886. *Forbes and Hemsl.* in Journ. Linn. Soc. Bot. 23; 405, 1888. *Hayata* in Journ. Coll. Sci. Tokyo, 18; Art. 8, 10, 1904. *Eupatorium scandens Linn.* Sp. Pl. 836, 1753. *Miq.* Fl. Ind. Bat. 2; 28, 1856. *King and Gamb.* Mat. Fl. Malay. Penin. 16; 30, 1905.—A much branched climbing herb, with opposite, long petioled, membranous triangularly ovate leaves, which are 3 to 5-nerved from the base, obscurely dentate, usually glabrous, but sometimes densely covered with short hairs, the apex long acuminate; heads small, 4-flowered; bracts glabrous, linear, acute; corolla whitish; achenes 5-costate, glabrous or tubercled; pappus reddish brown, persistent, finely scabrous.

DISTRIBUTION:

In all warm countries of America, Africa, and Asia.

LUZON:

Baguio, Province of Benguet, June 1904, *Elmer* 6588.
Baguio, Province of Benguet, June 1904, *Barnes* 969.
Bosoboso, Province of Rizal, July 1903, *Merrill* 2780.

CULION:

December 1902, *Merrill* 490.

IV. INULOIDEAE.

Leaves usually alternate. Heads with the flowers all similar, or the outer ligulate. Disk and ray flowers usually both yellow. Anther cells (except *Laggera*) tailed. Style arms linear, obtuse or styles of the sterile flowers undivided.

Heads androgynous; involucral bracts dry or herbaceous; style arms of perfect flowers filiform.
  Heads corymbose or paniculate.
    Herbs or shrubs with broad involucral bracts.
      Pappus copious.

18. PLUCHEA.

Pappus none.

19. EPALTES.

Chiefly herbs, with narrow linear bracts.

Anthers tailed.

20. BLUMEA.

Anthers without tails.

21. LAGGERA.

Heads in dense ovoid masses.

Pappus none.

22. SPHAERANTHUS.

Pappus hairs slender.

23. PTEROCAULON.

Heads androgynous or homogamous: involucral bracts hyaline and scarious; style arms of perfect flowers truncate.

Perfect flowers sterile, with undivided styles.

24. ANAPHALIS.

Perfect flowers usually fertile, with divided styles.

25. GNAPHALIUM.

Heads heterogamous, radiate, rarely subdisciform or homogamous; flowers usually all fertile; receptacle naked; perfect flowers with linear style arms, rounded or dilated at the top.

26. CARPESIUM.

18. PLUCHEA CASS.

Herbs or small shrubs with alternate dentate or serrate leaves, rather small heterogamous heads in terminal corymbs. Involucre ovoid, the bracts herbaceous, imbricate; receptacle flat, mostly naked; outer flowers fertile, filiform, 3-dentate; the central ones perfect or sterile, 5-dentate; anthers saggitate, the auricles caudate; style entire or cleft; achenes 4 to 5-angled; pappus capillary, scabrous.

Species about 40; in all tropical and subtropical regions.

Heads less than 4 mm. in diameter; a small shrub confined to the seashore and banks of tidal streams.

1. P. indica.

Heads more than 4 mm. in diameter; plants not confined to the seashore.

Lower bracts ovate.

2. P. scabrida.

Bracts all linear.

3. P. hirsuta.

1. P. indica (Linn.) Less. in Linnaea 6; 150, 1831. *DC.* Prod. 5; 451, 1836. *Miq.* Fl. Ind. Bat. 2; 58, 1856. *Benth.* Fl. Hongk. 179, 1861: Fl. Austr. 3; 527, 1866. *F. Vil.* Nov. App. 116, 1880. *Vid.* Rev. Pl. Vasc. Filip. 162, 1886. *Baccharis indica Linn.* Sp. Pl. 861, 1764. *Blco.* Fl. Filip. ed. 1; 627, 1837: ed. 2; 438, 1845. *Forbes and Hemsl.* in Journ. Linn. Soc. Bot. 23; 422, 1888. *Hayata* in Journ. Coll. Sci. Tokyo, 18; Art. 8, 31, 1904. *King and Gamb.* Mat. Fl. Malay. Penin. 16; 37, 1905. *Conyza indica Blm.* in *Miq.* Fl. Ind. Bat. 2; 58, 1856.—A small shrub with rather rigid divaricate branches. Leaves membranous, obovate, dentate, subglabrous. Heads very numerous, small, subcylindric; receptacle naked; involucral bracts coriaceous, imbricate; flowers lilac; pappus yellowish brown, copious, subglabrous.

DISTRIBUTION:

India, Malay and Japan.

LUZON:

Subig, Province of Zambales, January 1904, *Hallier.*

Bacolor, Province of Pampanga, June 1904, *Parker* 54.

MINDORO:

Bulalacao, April 1903, *Merrill* 916.

PANAY:

January 1904, *Copeland.*

2. P. scabrida DC. Prod. 5; 453, 1836. *F. Vil.* Nov. App. 116, 1880. *Conyza scabrida DC.* in *Miq.* Fl. Ind. Bat. 2; 59, 1858.—A much branched subscandent herb. Leaves subsessile, ovate to oblong, entire or slightly toothed, subcoriaceous, glabrous. Heads few, rather large and widely spreading when mature on terminal or subterminal peduncles; involucre broadly campanulate, the basal bracts ovate, obtuse, much shorter than the inner linear series; receptacle densely fibrillose; achenes subcompressed, finely ribbed; pappus white, silky.

DISTRIBUTION:

Only from the Philippines by *Haenke.*

MINDORO:

Baco River, March 1905, *Merrill* 4068.

PARAGUA:

Point Separation, February 1902, *Merrill* 829.

LEYTE:

Palo, January 1906, *Elmer* 7042.

MINDANAO:

Davao, April 1904, *Copeland.*

BASILAN:

January 1904, *Hallier.*

3. **P. hirsuta. (Linn.) Less.** in Linnaea. 150, 1831. *DC.* Prod. 5; 453, 1856. *F. Vil.* Nov. App. 116, 1880. *Conyza hirsuta Linn.* Sp. Pl. 863, 1753. *Miq.* Fl. Ind. Bat. 2; 59, 1856.—A slenderly branched subscandent herb. Leaves subsessile, membranous, pubescent along the midnerve beneath, entire or slightly toothed, linear to lanceolate, glabrous above. Heads large and spreading, not numerous, subglomerate along the distal portions of the branches; involucral bracts all linear, very unequal, soft pubescent; flowers yellow; achenes short strigose; pappus soft, white, silky.

This species is evidently closely related to the preceding species, differing in its bracts and other vegetative characters. Both stand in a doubtful position to *Pluchea* and *Blumea*, from the latter being distinguished by their hirsute fibrillose receptacles. *P. scabrida DC.*, has the broad basal bracts of *Pluchea*, while *P. hirsuta (Linn.) Less.*, has bracts typical of *Blumea.*

DISTRIBUTION:

China and Cochinchina.

MINDANAO:

San Ramon, Province of Zamboanga, February 1904, *Hallier.*

19. EPALTES CASS.

Herbs, with alternate usually decurrent leaves. Heads heterogamous, disciform, small, solitary or corymbose; outer flowers numerous, pistillate and fertile, its corolla filiform, 2 to 3-toothed; disk flowers perfect, usually sterile, its tubular limb 3 to 5-toothed; involucre broad; bracts in many series, dry and rigid; receptacle naked, flat or convex or raised; anther bases sagittate, its auricles minute and connate; tails small; style of perfect flower subulate, entire or bifid; achenes of pistillate flowers subterete, 5 to 10-ribbed, without pappus; those of the perfect flowers usually abortive, with or without few caducous pappus hairs.

Species 10; in the tropics of both hemispheres.

1. E. australis Less. in Linnaea 5; 148, 1831. *DC.* Prod. 5; 462, 1836. *Benth.* Fl. Austr. 3; 530, 1866. *Forbes* and *Hemsl.* in Journ. Linn. Soc. Bot. 23; 423, 1888.—Annual or perennial, branched from the base, diffuse or prostrate. Leaves petioled, ovate or cuneate to oblong, entire, toothed or almost lyrate, not decurrent. Heads hemispherical, lateral sessile or short pedunculate; bracts elliptic, concave, very obtuse; numerous female flowers not exceeding the involucre; disk flowers mostly sterile; achenes without pappus.

This species is very little known in the Orient. Specimens collected in northern Luzon have been so determined. Otherwise unknown to us.

DISTRIBUTION:

Australia.

LUZON:

Loher 3612 and 5086.

20. BLUMEA DC.

Annual or perennial, herbaceous or suffrutescent, erect herbs, glabrous or woolly, with alternate, usually toothed, rarely lobed leaves, and heterogamous heads, corymbosely paniculate or fascicled. Flowers yellow or purple, the pistillate outer flowers numerous, filiform, 2 to 5-toothed; disk flowers fewer, tubular, 5-toothed; involucre ovoid, its bracts imbricate, unequal, linear, herbaceous; receptacle flat, naked or somewhat hirsute; anther bases sagittate and slenderly tailed; achenes small, subterete or angled; pappus slender, soft, caducous.

Species 60; all of the old world, especially abundant in British India.

Suffrutescent and perennial coarse herbs.

  Leaves glabrous; heads upon slender 1 to 2 cm. long peduncles.

1. B. laxiflora.

  Leaves glabrous above and sparsely pubescent beneath; peduncles shorter.

2. B. appendiculata.

  Leaves pubescent on both sides; heads subsessily clustered.

    Involucral bracts subglabrous.

3. B. densiflora.

    Involucral bracts densely pubescent.

4. B. balsamifera.

Herbaceous, annuals and biennials.

  Peduncles glandular pubescent.

5. B. membranacea.

  Peduncles not glandular.

    Involucral bracts glabrous.

      Leaves lyrately lobed.

6. B. laciniata.

      Leaves toothed.

7. B. virens.

      Leaves subentire.

8. B. virens minor.

    Involucral bracts pubescent.

      Flowers purplish.

9. B. wightiana.

Flowers yellow.

Panicles with long divaricate branches, usually bearing sessile terminal glomerules.

10. B. manillensis.

Panicles more approximate, the heads scattered and pedunculate.

11. B. lacera.

1. B. laxiflora n. sp.—Suffrutescent shrub, 1 or more m. high; branches numerous, subglabrous. Leaves more or less clustered toward the ends of the twigs, dry, membranous, glabrous on both sides, very unequal in size, alternate, lanceolate, the larger ones 3 dm. long and 5 cm. wide across the middle, the base slenderly tapering into a 1 to 3 cm. long petiole, apex acuminate, margins dentately apiculate, the ascending nerves and reticulations equally distinct on both sides. Inflorescence lax, terminal, of several very unequal paniculate racemes, from 1 to 7 dm. long; its larger branches subtended by foliaceous bracts, the peduncles and pedicels by very minute strigose bracts; pedicels not numerous, divaricate, from 1 to 2 cm. long, very slender, strigose, minutely bracteate, flexuosely deflexed; heads campanulate, 1.5 cm. in diameter, 1 cm. high, solitary and subpendulous; involucre of many series and closely imbricated, persistent; the basal bracts sparsely strigose, narrowly acute or acuminate; the miner ones equalling the pappus, finely scarious, linear, terminating into soft and slender setae; corolla yellow, 5 mm. long, slenderly tubular except toward the apex which is slightly inflated and terminated by 3 short acute teeth; stamens 5, included; style exerted, divided into filiform arms; achene barely 1 mm. in length, subterete, finely striate and strigose; pappus soft, dense, nearly equal, reddish brown, 4 mm. long.

Type specimen 8231, *A. D. E. Elmer*, Los Baños, Province of Laguna, Luzon, May, 1906. Related to *B. spectabilis DC.*

2. B. appendiculata (Blm.) DC. Prod. 5; 447, 1836. *F. Vil.* Nov. App. 115, 1880. *Conyza appendiculata Blm.* Bijd.

895, 1825-6. *Miq.* Fl. Ind. Bat. 2; 56, 1856.—Suffrutescent shrubs, 1 m. high or less, its smaller branches yellowish adpressed pubescent. Leaves in subwhorls, subtending the inflorescence, obovate to oblanceolate, membranous, apiculately serrate, soft puberulent and sparsely yellowish pubescent beneath, the smaller lanceolate, subglabrous and slightly scabrous on the upper surface of the old leaves, 1 to 3 dm. long, 5 to 8 cm. wide, apex acute to acuminate, base gradually tapering, the 9 to 12 pairs of nerves faint. Inflorescence a large elongated panicle, 2 to 3 dm. long, 1.5 dm. wide; its branches spreading, 1 dm. long or less, soft pubescent, flower bearing above the middle, subtended by pubescent foliaceous bracts; branchlets slender, bearing from 1 to 3 heads; peduncle with a single head, subflexuose, 1 to 2 cm. long, minutely bracteate; involucral bracts numerous, very unequal in length, straw colored, narrowly linear, finely pubescent, ultimately spreading, the longer ones 1 cm. in length, persistent; heads 1.5 cm. in diameter, 1 cm. high; flowers many, perfect, yellow; corolla tubular, 7 mm. long including the 5 acute segments which are somewhat glandular and sparsely strigose on the outer side; anthers 3 to 4 mm. long, linear, apex rounded, bases extended into bristle like tails; style barely exceeding, slender, subglabrous, with 2 linear stigmatic arms which have truncate apices; achene 1.5 mm. long, 10-costate, compressed, silkily pubescent; pappus yellowish white, bristle like, unequal in length, finely scabrous, longer ones 6 mm. long.

DISTRIBUTION:

Java.

PHILIPPINES:

Luzon and Paragua.

3. **B. densiflora DC.** Prod. 5; 446, 1836. *F. Vil.* Nov. App. 115, 1880. *Hook.* Fl. Brit. Ind. 3; 269, 1881.—A suffrutescent much branched aromatic species. Leaves oblanceolate, coarsely toothed, puberulent or minutely pubescent above, yellowish pubescent and conspicuously nerved beneath. Heads subsessile, large, not numerous, crowded at the ends of the woolly pubescent peduncles and forming a

rather dense flat topped panicle; basal involucral bracts short, persistent, usually pubescent, the inner ones linear, ultimately recurved, glabrous. Corolla yellow; achene short, strigose pubescent; pappus bristles equal in length, copious, yellowish brown.

DISTRIBUTION:

British India.

MINDANAO:

San Ramon, Province of Zamboanga, May 1904, *Copeland* 791.

4. **B. balsamifera (Linn.) DC.** Prod. 5; 447, 1846. *F. Vil.* Nov. App. 115, 1880. *Naves* in Fl. Filip. ed. 3; 403, 1880. *Hook.* Fl. Brit. Ind. 3; 270, 1881. *Vid.* Sinop. Atlas, t. 58. 1883: Cat. Pl. Prov. Manila, 34, 1880: Phan. Cuming. Filip. 121, 1885. *Mart.* in Nuov. Giorn. Bot. Ital. 15; 293, 1883. *Vid.* Rev. Pl. Vasc. Filip. 161, 1886. *Forbes* and *Hemsl.* in Journ. Linn. Soc. Bot, 23; 420, 1888. *Hayata* in Journ. Coll. Sci. Tokyo 18; Art. 8, 30, 1904. *King* and *Gamb.* Mat. Fl. Malay, Penin. 16; 33, 1905. *Conyza balsamifera Linn.* Sp. Pl. ed. 2; 1208, 1763. *Blco.* Fl. Filip. ed. 1; 628, 1837. *Miq.* Fl. Ind. Bat. 2; 55, 1856. *B. glomerata DC.* in *F. Vil.* Nov. App. 115, 1880.—A strongly aromatic suffrutescent perennial, 2 to 3 m. high. Leaves entire or serrate, lanceolate, silky canescent beneath, subglabrous or only slighlty pubescent above. Heads forming a corymbose panicle, the peduncles short, silky pubescent; involucral bracts densely pubescent, unequal, imbricate; corolla yellow; pappus copious, very slender, yellowish white to reddish brown.

DISTRIBUTION:

India, Malay and Japan.

PHILIPPINE:

1894-5, *Marave* 186.

1836-41, *Cuming* 993.

LUZON:

Bauang, Province of Union, February 1904, *Elmer* 5614.

Mount Mariveles, Province of Bataan, April 1904, *Whitford* 36.

Guinayangan, Province of Tayabas, April 1903, *Merrill* 2059.

Humingan, Province of Pangasinan, April 1902, *Merrill* 279.

MINDORO:

Baco, January 1903, *Merrill* 1231.

CULION:

December 1902, *Merrill* 445.

PARAGUA:

E-wi-ig River, February 1903, *Merrill* 721.

MINDANAO:

Santa Cruz, Province of Davao, April 1903, *De Vore* and *Hoover* 269.

BASILAN:

April 1903, *De Vore* and *Hoover* 5.

January 1904, *Hallier.*

5. B. membranacea (Wall.) DC. Prod. 5; 440, 1836. *F. Vil.* Nov. App. 115, 1880. *Hook.* Fl. Brit. Ind. 3; 265, 1881. *King* and *Gamb.* Mat. Fl. Malay. Penin. 16; 35, 1905. *Conyza membranacea Wall.* in *Miq.* Fl. Ind. Bat. 2; 49, 1856.—An erect herb with one or more stems from the base, about 1 m. high; leaves sessile, oblanceolate, membranous, uniformly pubescent on both surfaces, sharply toothed or irregularly lobed. Heads not crowded, subsessile, or upon glandular pubescent peduncles; involucral bracts imbricate, often tinged with purple, soft pubescent; corolla yellow; achenes short, subglabrous; pappus dull white, silky.

DISTRIBUTION:

Malayan Peninsula and Japan.

LUZON:

Bauang, Province of Union, February 1904, *Elmer* 5621.

6. B. laciniata (Roxb.) DC. Prod. 5; 436, 1836. *F. Vil.* Nov. App. 115, 1880. *Hook.* Fl. Brit. Ind. 3; 264, 1881. *Vid.* Phan. Cuming. Filip. 121, 1885: Rev. Pl. Vasc. Filip. 162, 1886. *Forbes* and *Hemsl.* in Journ. Linn. Soc. Bot. 23; 421, 1888. *Conyza laciniata Roxb.* Hort. Beng. 61, 1814.—A much branched glabrous annual about 1 m. high. Leaves subscabrid on both surfaces, serrate and irregularly lobed, oblanceolate, slenderly petioled. Panicle glabrous, much branched, the bracteolate peduncles bearing solitary heads; involucral bracts acute, glabrous; persistent; corollas yellow; achenes subterete, pubescent; pappus silky white.

DISTRIBUTION:

India.

LUZON:

Bauang, Province of Union, February 1904, *Elmer* 5732.
Subig, Province of Zambales, January 1904, *Hallier*.
Province of Pampanga, March 1903, *Merrill* 1456.

CULION:

December 1902, *Merrill* 622.

7. B. virens DC. in *Wight* Contrib. 14, 1834: Prod. 5; 439, 1836. *Hook.* Fl. Brit. Ind. 3; 264, 1881. *Mart.* in Nuov. Giorn. Bot. Ital. 15; 291, 1883. *Vid.* Phan. Cuming. Filip. 122, 1885: Rev. Pl. Vasc. Filip. 162, 1886. *Rolfe* in Journ. Linn. Soc. Bot. 23; 213, 1885.—A glabrous or subglabrous widely branching herb, with one or more stems from the base. Leaves obovate, membranous, glabrous, irregularly serrate but not lobed. Heads upon short glabrous or pubescent peduncles; involucral bracts glabrous: corollas yellow; achenes finely pubescent; pappus dull white, silky.

DISTRIBUTION:

India.

PHILIPPINES:

1836-41, *Cuming* 659 and 1023.

8. B. virens minor Hook. Fl. Brit. Ind. 3; 264, 1881.—A slender unbranched annual, 20 to 30 cm. high. Stem glabrous, one or more from the base. Leaves usually below the middle of the stem, several, radical, 2 cm. long, 5 mm. wide, oblanceolate, sessile, sparsely strigose, entire or remotely apiculate above the middle. Heads few, forming a sparse elongated panicle, the peduncles subglabrous; involucral bracts persistent, scariously margined; flowers yellow; receptacle naked; achenes subcylindric, finely ribbed, obscurely pubescent; pappus white, soft, silky.

DISTRIBUTION:

India.

CULION:

February 1903, *Merrill* 679.

9. B. **wightiana DC.** Prod. 5; 435, 1836. *F. Vil.* Nov. App. 115, 1880. *Hook.* Fl. Brit. Ind. 3; 261, 1881. *Mart.* in Nuov. Giorn. Bot. Ital. 15; 290, 1883. *Vid.* Rev. Pl. Vasc. Filip. 161, 1886: Phan. Cuming. Filip. 122, 1885. *Forbes* and *Hemsl.* in Journ. Linn. Soc. Bot. 23; 422, 1888. *B. chamisonis DC.* in *F. Vil.* Nov. App. 115, 1880. *King* and *Gamb.* Mat. Fl. Malay. Penin. 16; 34, 1905. *Conyza bifoliata C.* et *L.* in *Miq.* Fl. Ind. Bat. 2; 42, 1856.—A slender softly pubescent, much branched annual or biennial. Stems and branches many, pubescent. Leaves many, the lower ones broadly obovate, subsessile, membranous, silky pubescent on both surfaces, finely serrate, the apex obtuse, the base long acuminate. Panicles spicate, leafy; heads peduncled or subsessile; involucral bracts long silky pubescent, purplish; corolla purple; receptacle pitted; achenes minute, glabrous; pappus usually of fine silky white bristles.

DISTRIBUTION:

China, Australia, Malay Islands, India and tropical Africa.

PHILIPPINES:

1894-5, *Marave* 174.

1836-41, *Cuming* 1139 and 1663.

LUZON:

Manila, February 1903, *Merrill* 3806.

Baguio, province of Benguet, January 1903, *Topping* 142.

10. B. manillensis (Less.) DC. Prod. 5; 435, 1836. *F. Vil.* Nov. App. 115, 1880. *Conyza manillensis Less.* in Linnaea, 6; 135, 1831. *Miq.* Fl. Ind. Bat. 2; 42, 1856. *Conyza gouiana Blco.* Fl. Filip. ed. 1; 629, 1837. *Conyza erosa Blco.* Fl. Filip. ed. 2; 439, 1845.—A much branched annual or biennial, 1 m. high or less. Larger leaves lyrately lobed, irregularly toothed, strigose on both surfaces. Panicle large, divaricately spreading; heads usually clustered at the ends of the branchlets, sessile or slightly exceeding the flowers, persistent; corolla yellow; receptacle minutely hirsute; achenes minute, strigose; pappus hairs 9 to 12 on each achene, dull white, minutely scabrous.

DISTRIBUTION:

Java.

LUZON:

Arayat, Province of Pampanga, March 1903, *Merrill* 1428.

Manila, December 1902, *Merrill* 631.

Antipolo, Province of Rizal, February 1903, *Merrill* 1296.

CULION:

December 1902, *Merrill* 565.

MINDANAO:

Davao, April 1903, *De Vore* and *Hoover* 130.

11. B. lacera (Burm.) DC. Prod. 5; 436, 1836. *Benth.* Fl. Hongk. 178, 1861: Fl. Austr. 3; 525, 1866. *F. Vil.* Nov. App. 1880. *Hook.* Fl. Brit. Ind. 3; 263, 1881. *Mart.* in Nuov. Giorn. Bot. Ital. 15; 291, 1883. *Vid.* Phan. Cuming. Filip. 121, 1885: Rev. Pl. Vasc. Filip. 162, 1886. *Forbes* and *Hemsl.* in Journ. Linn. Soc. Bot. 23; 421, 1888. *Conyza lacera Burm.* Fl. Ind. 180, 1768. *Miq.* Fl. Ind. Bat. 2; 42, 1856. *B. napifolia DC.* in *F. Vil.* Nov. App. 115, 1880. *King* and *Gamb.* Mat. Fl. Malay. Penin. 16; 35, 1905.—An annual or biennial herb, about 80 cm. high. Stems solitary or several from the root. Leaves obovate, coarsely dentate or obscurely lobed, the base, extending into a decurrent petiole, apex rounded or obtuse. Heads in short axillary cymes or in terminal spike like panicles, rarely corymbose; bracts of the involucre narrow acuminate, hairy; receptacle glabrous; corolla yellow; achenes glabrous, obscurely 4-angled.

DISTRIBUTION:

China, Malay Islands, India and in tropical Africa.

LUZON:

Bacolor, Province of Pampanga, May 1904, *Parker* 44.
Rosales, Province of Pangasinan, May 1902, *Merrill* 277.

MINDORO:

Baco River, April to May 1905, *McGregor* 115.

CULION:

February 1903, *Merrill* 672.

21. LAGGERA SCHULTZ. BIP.

Chiefly perennial herbs with alternate decurrent leaves, and heterogamous, paniculate or axillary heads. Bracts of the campanulate involucre numerous, unequal, imbricate. Receptacle flat, naked. Outer flowers pistillate and fertile, numerous, filiform, the central ones tubular, perfect, 5-toothed. Anther bases unequally obtuse. Style arms flattened.

Species 10; chiefly African, a few in tropical Asia.

1. L. alata (DC.) Schultz. Bip. in Trans. Linn. Soc. 39; 94, 1873. *F. Vil.* Nov. App. 116, 1880. *Hook.* Fl. Brit. Ind. 3; 281, 1881. *Vid.* Phan. Cuming. Filip. 122, 1885: Rev. Pl. Vasc. Filip. 162, 1886. *Forbes* and *Hemsl.* in Journ. Linn. Soc. Bot. 23; 422, 1888. *Blumea alata DC.* Prod. 5; 448, 1836. *Conyza tetraptera Turcz.* in Bull. Soc. Nat. Mosc. 24; 178, 1851. *Miq.* Fl. Ind. Bat. 2; 1078, 1856. *Blumea tetraptera Rolfe* in Journ. Linn. Soc. Bot. 21; 313, 1884.—A rigid erect perennial, with finely dentate sessile leaves, densely covered with short brown hairs, narrowly oblong, the midvein prominent, the lateral ones irregularly anastomosing. Heads on axillary bracteate peduncles, ultimately subpendulous. Outer involucral bracts rather broad, pubescent, the inner ones linear, glabrous, equalling the flowers. Achenes short, subcylindric, pubescent, ribbed; pappus caducous, glabrous, very slender.

DISTRIBUTION:

Tropical Asia and Africa, and on Madagascar.

PHILIPPINES:

1836–41, *Cuming* 988.

22. SPHAERANTHUS LINN.

Low, much branched annuals, with its alternate leaves toothed and decurrent. Heterogamous flowers small, clustered in dense globose terminal heads, with or without subtending bracts; outer flowers fertile, slender, minutly 2 to 3-toothed; central ones fewer, perfect, tube thickened, 4 to 5-toothed; bracts of narrow involucre unequal; anther bases sagittate; style arms filiform or connate; achene subcompressed; pappus none.

Species 17; throughout the tropics of the old world.

1. S. africanus Linn. Sp. Pl. ed 2; 1314, 1762-5. *F. Vil.* Nov. App. 116, 1880. *Hook.* Fl. Brit. Ind. 3; 275, 1881. *Vid.* Phan. Cuming. Filip. 122, 1885: Rev. Pl. Vasc. Filip. 162, 1886. *Forbes* and *Hemsl.* in Journ. Linn. Soc. Bot. 23; 423, 1888. *Merr.* Govt. Lab. Pub. 27; 55, 1905. *King* and *Gamb.* Mat. Fl. Malay. Penin. 16; 38, 1905. *S. elongatus Blco.* Fl. Filip. ed. 1; 636, 1837. *S. alatus Blco.* Fl. Filip. ed. 1; 655, 1837. *S. indicus Linn.* in *Blco.* Fl. Filip. ed. 2; 442, 1845. *S. microcephalus Willd.* in *Miq.* Fl. Ind. Bat. 3; 36, 1856.—A nearly glabrous, slightly fragrant, prostrate herb. Leaves oblanceolate, finely serrate or nearly entire decurrent lobes. Capitate head 1 cm. in diameter; flowers small, light blue, tubes persistent to the achene; bracts, few, not imbricate, scarious, truncate or obtuse; achene short, strigose.

DISTRIBUTION:

Africa, Persia, India, Malay Islands, China and Australia.

PHILIPPINES:

1894-5, *Marave* 75.

LUZON:

Bauang, Province of Union, February 1904, *Elmer* 5627.
Manila, January 1904, *Elmer* 5506.
Bacolor, Province of Pampanga, May 1904, *Parker* 46.
Manila, May 1902, *Merrill* 45.

PANAY:

January 1904, *Copeland.*

BASILAN:

April 1903, *De Vore* and *Hoover* 19.

23. PTEROCAULON ELL.

Tomentose herbs, with alternate decurrent leaves. Heads heterogamous, collected in globose terminal or scattered spicate clusters; numerous outer flowers fertile, filiform, 2 to 3-toothed; perfect central ones few, usually sterile, tubular, 5-tootned; involucre ovoid, its bracts narrow; receptacle small, glabrous or with deciduous hairs; bases of anthers sagittate, its auricles tailed and often connate; style arms of perfect flowers filiform; achenes 4 to 5-ribbed; pappus slender, 1 or 2-seriate. Species 12; in the tropics of both the eastern and western hemispheres.

1. **P. cylindrostachum Clarke** Comp. Ind. 98, 1876. *F. Vil.* Nov. App. 116, 1880. *Hook.* Fl. Brit. Ind. 3; 275, 1881. *Vid.* Phan. Cuming. Filip. 122, 1885. *Merr.* Govt. Lab. Publ. 27; 55, 1905. *P. redolen Benth.* in *F. Vil.* Nov. App. 116, 1880. *Monenteles redolens Lab.* in *DC.* Prod. 5; 455, 1836.—A coarse 3 to 5 dm. high herb, with rigid densely woolly stems and erect branches. Leaves ovate, obscurely dentate, densely tomentose beneath, less so above. Clusters of heads sessile, forming a more or less interrupted terminal spike; bracts chiefly in two series, the basal one persistent and covered with a matrix of long woolly hairs; the upper series glabrous and caducous; corollas yellow; achene short, subglabrous; pappus nearly white, caducous, uniseriate.

DISTRIBUTION:

India, New Caledonia and Australia.

PHILIPPINES:

1836-41, *Cuming* 962.

LUZON:

Santa Maria, Province of Isabela, June 1902, *Merrill* 184.

24. ANAPHALIS DC.

Perennial, rarely annual herbs, with usually several stems from the root. Leaves woolly or cottony, alternate. Heads heterogamous, small, in corymbose clusters; involucre turbinate, the bracts many, scarious; receptacle naked; outer flowers pistillate and fertile, numerous, filiform, 3-toothed; the central ones perfect, sterile, tubular, with a 5-toothed subcampanulate limb; anther bases sagittate, the auricles connate and tailed; achenes very small, oblong; pappus hairs of the outer flowers slender, of the inner ones often thickened at the ends.

Species 30; in temperate and subtemperate regions of the old world, only one species in North America.

1. A. cinnamomea (DC.) Clarke Comp. Ind. 104, 1876. *Hook.* Fl. Brit. Ind. 3; 281, 1881. *Antennaria cinnamomea DC.* Prod. 6; 270, 1837.—A small tufted perennial, 30 to 50 cm. high, usually branched from the base. Leaves cauline, linear, obtuse not decurrent, entire, the margins recurved, densely cottony beneath and slightly so or becoming glabrous above, 1-nerved. Corymbs small; heads homogamous, the short peduncles densely cottony; involucral bracts acute, the basal ones woolly pubescent, the inner ones rather broad, white petaloid; flowers numerous, only a few central ones perfect, the segments of the corollas papillose; achenes obscurely striate, very small; pappus light brown, barbellate.

This genus is here reported for the first time from the Philippines, being found in the pine region at and above an altitude of 2300 meters.

DISTRIBUTION:

In alpine districts of India, China and Japan.

Luzon:

Mount Santo Tomas, Province of Benguet, May 1904, *Elmer* 6281.

25. GNAPHALIUM LINN.

Woolly, erect or diffusely branched herbs with alternate leaves. Inflorescence corymbose, spicate or racemose; heads heterogamous, small; receptacle flat or conic, usually faveolate; pistillate flowers many, their filiform corollas minutely 5 to 4-dentate; central flowers few, perfect, tubular, 5-segmented; bases of anthers sagittate, their auricles tailed; achenes not costate, obovoid; pappus of a single series of capillary bristles.

Species 120; in both the old and new worlds.

Bracts deep yellow.

1. G. luteo-album.

Bracts light yellowish.

2. G. multiceps.

Bracts not yellow.

Leaves glabrous above.

3. G. oblancifolia.

Leaves pubescent on both sides.

4. G. indicum.

1. G. luteo-album Linn. Sp. Pl. 851, 1753. *DC.* Prod. 6; 230, 1837. *Miq.* Fl. Ind. Bat. 2; 91, 1856. *Benth.* Fl. Austr. 3; 653, 1866. *Hook.* Fl. Brit. Ind. 3; 288, 1881. *Rolfe* in Journ. Linn. Soc. Bot. 23; 213, 1885. *Vid.* Phan. Cuming. Filip. 122, 1885. *Staff* in Trans. Linn. Soc. Bot. 4; 187, 1894. *Hayata* in Journ. Coll. Sci. Tokyo, 18; Art. 8, 32, 1904. *G. palidum Lam.* and *G. javanum DC.* in *F. Vil.* Nov. App. 116, 1880. *Mart.* in Nuov. Giorn. Bot. Ital. 15; 294, 1883.—Erect annuals, 3 to 6 dm. high. Stems usually branched from the base, pubescent. Leaves linear or spatulate, obtuse, not decurrent, woolly pubescent on both sides, radical and cauline. Inflorescence a much branched corymb, terminal; heads crowded upon the distal ends of the lanose branches, subsessile; involucre campanulate; bracts persistent, thin, nearly all glabrous; corolla yellowish; achene minute, subglabrous, bearing a yellowish brown pappus.

DISTRIBUTION:

De Candolle and *Miquel* report this species from Europe, Africa, Asia and South America, extending into the mountains up to 3350 meters. It is common in grass lands of the pine region about our summer capitol in the mountains.

PHILIPPINES:

1836-41, *Cuming* 1025.

LUZON:

Libtong Villasis, Province of Pangasinan, May to June 1904, *Alberto* 75.

Baguio, Province of Benguet, March 1904, *Elmer* 5757.

Province of Benguet, May to June 1904, *Barnes* 957.

Baguio, Province of Benguet, January to February 1903, *Topping* 108.

2. G. multiceps Wall. in **DC.** Prod. 6; 222, 1837. *Benth.* Fl. Hongk. 188, 1861. *Forbes* and *Hemsl.* in Journ. Linn. Soc. Bot. 23; 427, 1888. *Hayata* in Journ. Coll. Sci. Tokyo, 18; Art. 8, 31, 1904.—Erect sparingly branched biennial. Stems lanose pubescent even with age. Leaves comparatively few, scattered along the stems and branches, oblanceolate, sessile, not decurrent, 4 to 8 cm. long, 0.5 to 1.5 cm. wide, acute, base attenuate, obscurely 3-nerved toward the base, white tomentose especially so beneath; branches toward the inflorescence sulphureous yellow. Heads of the glomerules crowded, subsessile, subtended by bracts covered with a dense matrix of soft glistening white hairs; bracts of the involucre dry, glabrous, white toward the apex or with age becoming yellow.

This species is not easily recognized as distinct from *G. luteo-album Linn.* and may be only a broad leafed less yellow bracteate form of it.

DISTRIBUTION:

Northern India, China and Formosa.

PHILIPPINES:

Northern Luzon.

3. G. oblancifolium n. sp.—A perennial, tufted, herbaceous, 4 dm. high herb; stems rather slender, in the younger state covered with white adpressed woolly hairs, sparsely branched, bearing axillary and terminal clusters of flowering heads. Leaves mostly radical, linear or oblanceolate, conspicuously 1-nerved beneath, glabrous above, beneath densely white lanose, apex acute or the uppermost long acuminate, the lower half slenderly attenuate into a narrow winged petiole, cauline ones very similar with exstipulate bases not decurrent. Heads 6 or more, clustered upon short bracteolate peduncles, the subtending leaf and lower bracts usually much exceeding, 3 to 5 mm. long, 3 mm. in diameter near the base; bracts of the involucre mostly thin and glabrous except the short acuminate basal ones subtended by long woolly hairs, imbricate and of unequal length, the longer ones oblanceolate to acute, dark brown on the exposed surfaces; flowers very numerous the outer several series only pistillate, the fewer central ones perfect; tubular corolla of outer flowers 5 mm. long, very slender, truncate or minutely 3-toothed; style arms truncate and ultimately recurved; corolla tube of central flowers shorter but much thicker, terminated by 5 short blunt segments; anthers 1 mm. long, obscurely appendaged at apex, base fibrillose; filaments comparatively short, inserted upon the middle of the tube; style of these flowers included, terminated by small capitate stigmas; pappus uniseriate, yellowish white, scabrous under a lens, exceeding the flowers; achene finely pubescent, 5 mm. in length, obscurely striate.

Type specimen 6586, *A. D. E. Elmer*, is rather abundant in open grassy pine regions on Mount Santo Tomas, province of Benguet, Luzon, June, 1904 at an altitude of 2500 meters. Strict floral distinction between the genera of *Antennaria*, *Anaphalis* and *Gnaphalium* are hard to find, but in general appearance our species possesses the *Gnaphalium* habit.

4. G. indicum Linn. Sp. Pl. ed. 2; 1200, 1763. *DC.* Prod. 7; 231, 1839. *Miq.* Fl. Ind. Bat. 2; 92, 1856. *Benth.* Fl. Hongk. 188, 1861: Fl. Austr. 3; 655, 1866. *F. Vil.* Nov. App. 116, 1880. *Hook.* Fl. Brit. Ind. 3; 269, 1881. *Forbes* and *Hemsl.* in Journ. Linn. Soc. Bot. 23; 427, 1888. *Hayata* in Journ. Coll. Sci. Tokyo, 18; Art. 8, 33, 1904. *Xeranthemum* *stacnelina Blco.* Fl. Filip. ed. 1; 629, 1837. *G. dichotemum Blco.* Fl. Filip. ed. 2; 439, 1845.—Stems many, ascending, soft cottony, leafy, 12 to 20 cm· high. Leaves linear obovate, woolly pubescent on both surfaces, the larger leaves subtending fascicles of smaller ones. Inflorescence terminal, spicate; heads sessile or subsessile; basal bracts pubescent, upper ones dull white; flowers whitish; achenes minutely papillose; pappus hairs free.

The herbarium contains no specimens of this species from the Philippines, but since it has been reported from Formosa, China and the Malayan region, it can easily be suspected to occur on some of our islands.

DISTRIBUTION:

Tropical Africa and Asia, Australia and Japan.

26. CARPESIUM LINN.

Erect branched herbs. Leaves alternate. Heads terminal or axillary, sessile or peduncled, usually drooping, heterogamous, disciform, yellow; outer flowers pistillate, many seriate, fertile, slender, 3 to 5-toothed; disk flowers perfect, fertile, slender, limb slightly dilated; 5-toothed; involucre hemispheric or subglobose; bracts in few series, the broad inner ones dry and obtuse, the outer with foliaceous tips; receptacle flat, naked; anther bases sagittate, taíls slender; style arms linear, obtuse, connivent; achenes elongated, striate and often with a glandular beak surmounted by a corona; pappus none.

Species about 4 or 5; European, temperate and subtropical Asia.

1. **C. cernuum glandulosum Clarke** in *Hook.* Fl. Brit. Ind. 3; 301, 1881. *C. cernuum Linn.* in *Merr.* Philip. Journ. Sci. 1, Suppl. 3; 243, 1906. *Forbes* and *Hemsl.* in Journ. Linn. Soc. Bot. 23; 430, 1888.—Leaves elliptic to lanceolate, obtuse, sinuate, toothed or subentire, the upper shortly petioled, the basal ones slenderly petioled, ovate or cordate. Heads terminal, drooping, with broad leafy bracts; outer involucral bracts leafy, spreading, usually hirsute or villous.

DISTRIBUTION:

An alpine plant of the subtemperate region of the old world.

Luzon:

Mount Tonglon, Province of Benguet, November 1905, *Merrill* 4832.

Suyoc to Panai, Province of Benguet, November 1905, *Merrill* 4688.

Mount Data, Province of Lepanto, November 1905, *Merrill* 4512.

III. ASTEREAE.

Leaves usually alternate. Heads with the flowers all similar, or the outer ligulate. Receptacle always naked. Disk flowers yellow; ray flowers yellow, white or purple, Anthers subentire at the base. Style arms flattened or plano convex, all or those of the disk flowers terminated by a cone.

Flowers all yellow; those of the ray ligulate.

9. SOLIDAGO.

Flowers all yellow, rayless; pappus hardly any.

Receptacle usually elongate; achenes with a thickened border.

10. DICHROCEPHALA.

Receptacle conic or convex; achenes with a terminal. toothed or bristly ring.

11. GRANGEA.

Ray flowers pistillate, ligulate, never yellow; disk flowers yellow; pappus none or very short.

Herbs with many branches.

12. MYRIACTIS.

Stemless herbs.

13. LAGENOPHORA.

Ray flowers pistillate, ligulate, never yellow; disk flowers yellow; pappus hairs long, copious.

14. ASTER.

Ray flowers very slender, tubular, or with very short ligules, and disk flowers yellow; pappus copious or scanty.

Tall or climbing shrubs; heads very small; pappus long.

15. MICROGLOSSA.

Erect herbs; heads various; pappus long.

Outer flowers all tubular.

16. CONYZA.

Outer flowers ligulate (ligules of our species few and minute).

17. ERIGERON.

9. SOLIDAGO LINN.

Perennial herbs with alternate, toothed or entire leaves. Heterogamous heads in terminal and axillary paniculate cymes or capitate clusters. Ray flowers ligulate, yellow or rarely white; disk flowers tubular, 5-segmented; involucre oblong, its bracts imbricate and unequal in length, alveolate; anthers obtuse at the base; style arms flattened, their appendages lanceolate; achenes terete, usually ribbed; pappus bristles numerous.

Species about 80; all North American, except one which extends throughout the north temperate zone.

1. Solidago virgaurea Linn. Sp. Pl. 880, 1753. *DC.* Prod. 5; 338, 1836. *Benth.* Fl. Hongk. 179, 1861. *Hook.* Fl. Brit. Ind. 3; 245, 1881. *Forbes* and *Hemsl.* in Journ. Linn. Soc. Bot. 23; 406, 1888. *Hayata* in Journ. Coll. Sci. Tokyo, 18; Art. 8, 10, 1904. *Merr.* in Philip. Journ. Sci. 1, Suppl. 3; 245, 1906.—Stems erect, strict, little branched, varying in height up to 9 dm. Lower leaves petioled, ovate or oblong, slightly toothed; upper ones narrower, smaller and nearly entire, Heads solitary or 2 to 4 together on short axilliary peduncles. forming an elongated leafy panicle; bracts narrow and acute; ray flowers about 8; achenes puberulous, ultimately glabrous.

Not common but rather widely distributed in the pine region of middle northern Luzon at 1700 meters elevation. Quite variable.

DISTRIBUTION:

North America, Europe, temperate Asia, China and Japan.

LUZON:

Baguio, Province of Benguet, *Loher* 3668.

Baguio to Ambuklao, Province of Benguet, October to November 1905, *Merrill* 4364.

10. DICHROCEPHALA DC.

Annual herbs with toothed, lyrate or pinnatifid leaves. Heads paniculate, small, globose, heterogamous; outer flowers not rayed, pistillate, 2 to 3-cleft; anthers truncate at the base, style arms of central flowers flattened, the tips lanceolate; pappus none or of only 2 minute bristles on the central achenes.

Species 5; Asiatic and African.

Glabrous herbs.

1. D. latifolia.

Pubescent herbs.

2. D. chrysanthemifolia.

1. G. latifolia DC. Prod. 5; 372, 1856. *Miq.* Fl. Ind. Bat. 2; 37, 1856. *Benth.* Fl. Hongk. 173, 1861. *F. Vil.* Nov. App. 114, 1880. *Hook.* Fl. Brit. Ind. 3; 545, 1881. *Vid.* Phan. Cuming. Filip. 121, 1885: Rev. Pl. Vasc. Filip. 161, 1886. *Forbes* and *Hemsl.* in Journ. Linn. Soc. Bot. 23; 406, 1888. *Staff* in Trans. Linn. Soc. Bot. 42; 188, 1894. *Hayata* in Journ. Coll. Sci. Tokyo, 18; Art. 8, 11, 1904. *King* and *Gamb.* Mat. Fl. Malay. Penin. 16; 30, 1905.—An erect glabrous branched herb, with alternate, lyrately lobed leaves, the larger lobes irregularly toothed. Heads solitary, terminal on stout rigid and glabrous peduncles; involucral scales small, chafy, persistent; receptacle knob like, pitted; achenes compressed, smooth.

DISTRIBUTION:

Tropical Asia, subtropical Africa, China and Japan.

LUZON:

Bagabag, Province of Nueva Vizcaya, June 1902, *Merrill* 112.

Mount Banahao, Province of Tayabas, October 1904, *Whitfo d* 957.

Baguio, Province of Benguet, June 1904, *Elmer* 6587.

2. D. chrysanthemifolia DC. in *Wight* Contr. 11, 1834: Prod. 5; 372, 1836. *Wight* Ic. t. 1095, 1844-56. *Clarke* Comp.

Ind. 36, 1876. *Miq.* Fl. Ind. Bat. 2; 48, 1856. *Hook.* Fl. Brit. Ind. 3; 245, 1881. *Forbes* and *Hemsl.* in Journ. Linn. Soc. Bot. 23; 406, 1888.—Annual or biennial herb. Stems erect, 1 to 2 dm. high, hispidly white pubescent, leafy; branches straight, rather rigid, ascending or divaricate, similarly pubescent. Leaves oblong or obovate in outline, the smaller ones coarsely serrate, the larger ones lyrately lobed, sessile or the basal leaves petiolate, densely hoary hispid pubescent on both sides, lobes usually rounded and largest toward the apex. Heads solitary upon stout leaf bracteate peduncles, 6 mm. in diameter, globose; receptacle short conical, roughly pitted; flowers dense, numerous, purplish; the ray flowers short, 4-segmented; disk achenes 1.5 mm. long, smooth, compressed, yellowish green, bearing at the apex the short subpersistent purplish white corolla.

Quite rare, and only recently reported from dry grassy ridges in the pine forests of northern Luzon at an altitude of 2,000 meters.

DISTRIBUTION:

China and British India, also in Africa.

LUZON:

Mount Data, Province of Lepanto, November 1905, *Merrill* 4533.

11. GRANGEA ADANS.

Prostrate or suberect villous herbs, with alternate pinnatifid leaves. Flowers of the globose heads yellow, rayless; the outer ones pistillate and fertile, those of the disk perfect; involucre broadly campanulate; receptacle naked, convex.

Species 1 to 2; Asiatic and African.

1. G. maderaspatana Poir. in *Lam.* Encycl. Suppl. 2; 825, 1810. *DC.* Prod. 5; 375, 1836. *Miq.* Fl. Ind Bat. 2; 38, 1856. *F. Vil.* Nov. App. 115, 1880. *Hook.* Fl. Brit. Ind. 3; 247, 1881. *Vid.* Rev. Pl. Vasc. Filip. 161, 1886. *Forbes* and *Hemsl.* in Journn. Linn. Soc. Bot. 23; 407, 1888. *Hayata* in Journ. Coll. Sci. Tokyo, 18; Art. 8, 12, 1904. *Perdicum tomentosa Blco.* Fl. Filip. ed. 1; 630, 1837.—A postrate herb

with lyrately pinnatifid leaves, the lobes rounded. Heads usually solitary, leaf opposed, upon recurved peduncles. Bracts of the involucre obtuse, pubescent, thin and strongly reticulate above the middle; corolla tubes slender, the outer ones bifid, the inner ones 2 to 4-segmented, the central 4 to 6-cleft; achenes compressed, smooth, the pappus hairs fine, united at the base into a persistent cupular ring.

Distribution:

Tropical Africa, Asia and Japan.

Luzon:

Arayat, Province of Pampanga, March 1903, *Merrill* 1471.

Manila, April 1902, *Merrill* 26.

12. MYRIACTIS LESS.

Erect annuals. Leaves alternate, toothed. Heads loosely panicled or solitary, homogamous, white, with a yellow disk; ray flowers 2 to many seriate; pistillate fertile, small, ligulate; ligules spreading or revolute; disk flowers 5-segmented, tubular, perfect; involucre semispheric; bracts few seriate, narrow, scariously margined; receptacle broad, convex, naked; anther bases obtuse; style arms of perfect flowers narrow, flattened, with lanceolate tips; achenes compressed, margined; pappus none.

Species 2 to 5; one in the Philippines, the others in Asia and Africa.

1. **M. humilis Merr.** in Philip. Journ. Sci. 1, Suppl. 3; 234, 1906.—Erect or decumbent herbs with many divaricate branches, 1 to 2 dm. high, the stems and branches strigose but soon becoming glabrous. Leaves chiefly from the basal portion of the stems and branches; membranous blades usually alternate or branch opposed, sparsely strigose on both sides, ovate in outline, 1 to 3-lobed, the terminal lobe usually largest and coarsely dentate; petioles slender, 1 to 3 cm. long. Heads solitary, upon slender peduncles, terminal or axillary, subtended by small bracts a trifle below the base of the head, 8 mm. in diameter, 6 mm. high; involucral bracts all equal, numerous, 4 mm. long, with thin margins,

obtuse, strigose along the middle; ray flowers pistillate; ligule oblong, 1.5 mm. or less in length, white; disk flowers yellow, staminate; its corolla 1.5 mm. long, tubular, regularly 5-cleft, with acute 1 mm. long lobes; anthers oblong to ovate, acute, not tailed at the base; style short, 2-cleft.

Common in the rain forests above 2,000 meters. The only species of this genus thus far known from the Philippines.

LUZON:

Mount Data, Province of Lepanto, November 1905, *Merrill* 4530.

13. LAGENOPHORA CASS.

Scapigerous turf forming herbs, with small heterogamously rayed heads. Involucre glabrous, its bracts in two series. Ligule of the fertile outer flowers white or bluish; disk flowers usually perfect, but often sterile; anther bases obtuse, entire; style arms of the perfect flowers narrow, flattened, their tips triangular; achenes compressed, beaked; pappus wanting.

Species 13; chiefly in the tropics of the East, one in the Sandwich Islands, and one in South America.

1. L. billardieri Cass. Dict. Sc. Nat. 25; 111, 1826. *DC.* Prod. 5; 307, 1836. *Benth.* Fl. Hongk. 175, 1861: Fl. Austr. 3; 507, 1866. *Hook.* Fl. Brit. Ind. 3; 248, 1881. *Mart.* in Nuov. Giorn. Bot. Ital. 15; 289, 1883. *Forbes* and *Hemsl.* in Journ. Linn. Soc. Bot. 23; 407, 1888. *Ceron* Cat. Pl. Herb. 101, 1892.—A low erect biennial, from a fascicle of slender fleshy roots. Leaves radical, entire or obscurely dentate, obovate finely pubescent. Scapes slender, bearing solitary heads. Bracts of the involucre scarious, persistent; flowers bluish white, falling early; achenes oblong, usually glabrous, the margins thickened.

A rare plant inhabiting well drained grassy slopes of high mountains. Easily recognized from all other Philippine genera by the deep seated fascicle of fleshy roots.

DISTRIBUTION:

In high altitudes of India, Australia, Malay Islands, China and Japan.

Luzon:

Baguio, Province of Benguet, June 1904, *Elmer* 6583.

14. ASTER LINN.

Perennial or rarely annual herbs, with alternate leaves, and corymbose or paniculate, rarely solitary inflorescence. Heads heterogamous, the ray flowers white, blue or purple, never yellow; involucre turbinate or hemispheric, its bracts variously imbricated; receptacle generally faveolate; anthers obtuse and entire at the base; style arms flattened, their appendages subulate; achenes nerved; pappus bristles numerous.

Species about 250; mostly in North America and Central America, only a few in the old world.

Stems and branches sparsely leafy; leaves 2 to 3 cm. long, 1 to 2 cm. wide.

1. A. philippinensis.

Stems and branches very leafy; leaves larger.

2. A. luzonensis.

1. **A. philippinensis Moore** in Journ. Bot. 43; 138, 1905.—Perennial, with slender erect branches. Leaves petiolate, ovate lanceolate, acute, base rotund, subcoriaceous, scabrous, entire or dentate toward the apex, 2 to 3 cm. long, 1 to 2 cm. wide. Heads heterogamous, minute, numerous and forming corymbs; ligulate flowers about 10, 3-toothed, white; involucral bracts in several series, faintly puberulous, oblong, obtuse; receptacle convex, faveolate; achene obscurely compressed, without ribs hispidly pilose; pappus hairs unequal, dirty white.

Its author writes "A very distinct species, easily known by the slender habit coupled with the small leaves and small *Vernonia* like heads. Highlands from 1600 to 2300 meters."

Luzon:

Province of Lepanto, *Whitehead*.

2. **A. luzonensis n. sp.**—A perennial, tufted, herbaceous species 1 m. tall; stem and branches terete, short pubescent

with yellowish brown hairs. Leaves alternate, numerous along the stem, ascending, oblanceolate, subsessile, shortly pubescent especially on the nerves beneath, harsh with fine tubercles on the entire upper surface, apex acute, base acuminate, margins dentate, those on the branches of the inflorescence quite numerous and reduced. Inflorescence paniculate, widely branched, rather rigid; peduncles and pedicels spreading, densely pubescent, subtended by ovate to linear bracts, divaricately spreading; heads solitary upon 8 mm. long pedicels, 1 cm. long, at least that in diameter across the top, campanulate, loosely spreading when fully mature; bracts of the involucre very unequal, several seriate, purplish along the margins and at the tips, the apex rounded or obtuse, broadly linear, brown pubescent on the exposed exterior surfaces, otherwise glabrous; ligulate flowers not numerous, 10 to 15 mm. long; corolla 8 mm. long, the thin slender tube 4 mm. long and glabrous; ligule proper blue, equally tapering at both ends, bearing from its throat an exerted 2-cleft style; the achenes 2 mm. long, roundish, flattened, narrowly ellipsoid or obovoid, pubescent; pappus 5 mm. long, of scabrous brown bristles; disk flowers tubular, 12 to 15 mm. long; tube of corolla 8 mm. long, the lower half subcampanulate and terminated by 5 bluish 2 mm. long circinately acuminate segments; anthers 2.5 mm. long, apex acute, base rounded or obscurely sagittate; slender filaments inserted at the middle of the tube; style much exerted, its short subcompressed arms acute; achenes 2 mm. long, slightly pubescent, 3-costate, cuneate.

Type specimen 6251, *A. D. E. Elmer*, Mount Santo Tomas, Province of Benguet, Luzon, May, 1904. It is quite common in grassy pine forests of 2,300 meters altitude, and is related to *A. trinervius Roxb.* which extends as far south as Formosa and which has lanceolate triplinerved leaves, glabrous stems and reddish pappus.

14. MICROGLOSSA DC.

Slender erect or climbing shrubs, with alternate entire leaves and corymbose or paniculate inflorescence. Heads small, heterogamous; ray flowers pistillate, fertile, the ligule minute, white; involucre campanulate, its bracts numerous; anther bases obtuse; style arms long, lanceolate; achenes angled; pappus hairs many, unequal.

Species 9; chiefly in Africa and southern Asia.

1. M. volubilis DC. Prod. 5; 320, 1836. *Miq.* Fl. Ind. Bat. 2; 24, 1856. *Hook.* Fl. Brit. Ind. 3; 256, 1881. *Mart.* in Nuov. Giorn. Bot. Ital. 15; 290, 1883. *Vid.* Rev. Pl. Vasc. Filip. 161, 1886. *Forbes* and *Hemsl.* in Journ. Linn. Soc. Bot. 23; 419, 1888. *Merr.* For. Bu. Bull. 1; 55, 1903. *Hayata* in Journ. Coll. Sci. Tokyo. 18; Art. 8, 19, 1904. *King* and *Gamb.* Mat. Fl. Malay. Penin. 16; 31, 1905.—A glabrous climbing shrub with petioled elliptic ovate membranous leaves, with 5 to 6 pairs of nerves. Heads 4 mm. long, the bracts of the involucre linear, obtuse, in many series; receptacle knob like, pitted; achenes compressed, 4-angled; pappus much exceeding the achenes, persistent, reddish brown.

DISTRIBUTION:

Japan, Malay, India, tropical Africa and Madagascar.

LUZON:

Sablan, Province of Benguet, April 1904, *Elmer* 6135.

MINDANAO:

Province of Davao, March 1902, *Ahern* 851.
Mount Apo, May 1903, *De Vore* and *Hoover* 307.

16. CONYZA LESS.

Herbs with alternate entire, toothed or cut leaves, and heterogamous corymbose or panicled, rarely solitary heads. Involucre campanulate, its bracts in two series; receptacle naked, pitted or fimbriate; outer pistillate flowers filiform, 2 to 3-toothed, rarely ligulate, the inner ones fertile, yellow, 5-toothed; anther base obtuse, entire; style arms of the outer flowers flattened, with long or short tips; achenes compressed; pappus slender.

Species about 50; throughout the tropics.

1. C. viscidula Wall. Cat. 3006, *DC.* Prod. 5; 383, 1836. *Blco.* Fl. Filip. ed. 1; 628, 1837. *Benth.* Fl. Austr. 3; 496,

1866. *F. Vil.* Nov. App. 115, 1880. *Hook.* Fl. Brit. Ind. 3; 258, 1881. *Vid.* Phan. Cuming. Filip. 121, 1885: Rev. Pl. Vasc. Filip. 161, 1886. *C. japonica Lam.* (*Loher* 3639). *C. oligandra Turcz.* in Bull. Imp. Nat. Soc. Mosc. 24; 178, 1851. *Baccharis ivaefolia Blco.* Fl. Filip. ed. 1; 27, 1837.—A variable species from 15 cm. to 2 m. high, with sessile oblanceolate, coarsely toothed, cinereously pubescent leaves; bracts of the involucre strigose, persistent; achenes short, smooth, bearing long yellowish brown pappus bristles.

DISTRIBUTION:

Japan, Java, Australia, India and New Caledonia.

LUZON:

Atimonan, Province of Tayabas, August 1904, *McGregory* 15.

Sariaya, Province of Tayabas, August 1904, *Whitford* 568.

Bayombong, Province of Nueva Vizcaya, May 1902, *Merrill* 360.

Mount Mariveles, Province of Bataan, August 1904, Forestry Bureau 1608, collected by *Borden.*

Mount Mariveles, Province of Bataan, May 1904, *Whitford.*

Subig, Province of Zambales, December 1904, *Hallier.*

Baguio, Province of Benguet, June 1904, *Elmer* 6570.

DOUBTFUL AND EXCLUDED SPECIES.

C. aegyptica Linn. (*Loher* 3638).

C. dentata Blco. Fl. Filip. ed. 1; 629, 1837.

C. cappa Blco. Fl. Filip. ed. 2; 438, 1845.

17. ERIGERON LINN.

Mostly herbs, with alternate or radical leaves, heads heterogamous, corymbose or paniculate, rarely solitary; marginal flowers in several series, ligulate, very narrow, not yellow, either longer than the involucre and erect or spreading, or shorter and filiform; disk flowers few or numerous, perfect;

involucral bracts narrow and numerous, in 1 or 2 nearly equal series, or rarely imbricate in several unequal series; receptacle usually flat, not chaffy; style arms narrow, the appendages lanceolate; achenes compressed, usually pubescent; pappus of many nearly equal bristles.

Species 150; all of which are endemic to North America, only the following species belong to South America and the old world generally.

1. E. linifolius Willd. Sp. Pl. 3; 1955, 1764. *Benth.* Fl. Hongk. 176, 1861. *Mart.* in Nuov. Giorn. Bot. Ital. 15; 289, 1883. *Forbes* and *Hemsl.* in Journ. Linn. Soc. Bot. 23; 418, 1888. *Hayata* in Journ. Coll. Sci. Tokyo, 18; Art. 8, 14, 1904. *Conyza ambigua DC.* Prod. 5; 381, 1836.—An erect annual, more or less clothed with soft hairs. Basal leaves petioled, oblong, coarsely toothed or almost pinnatifid; cauline ones sessile, linear entire; heads small, peduncled, hemispheric, forming an oblong panicle; bracts narrowly linear, acute, in 2 or 3 subequal series; pistillate flowers very numerous, shorter than the pappus, filiform, at least the outer ones bearing a minute narrow ligule; achenes flat, pubescent; pappus rusty white.

Very little known to us. Certain cosmopolitan species of *Conyza* are difficult to separate from this genus.

DISTRIBUTION:

Japan, China, and especially abundant in the Mediterranean region.

LUZON:

Loher 3615, 3616 and 3617.

VI. HELENIEAE.

Herbs. Heads usually with fertile ligulate ray flowers. Bracts of involucre herbaceous, mostly uniserial and equal, sometimes concave behind the ray achenes, but never enfolding them. Style arms of perfect flowers with either truncate or appendiculate tips. Pappus mostly paleaceous or none.

Pappus of 3 to 6 unequal scales.

43. TAGETES.

Pappus bristle like.

44. POROPHYLLUM.

43. TAGETES LINN.

Herbs, much branched, 3 to 5 dm. high. Leaves opposite, entire or pinnate. Heads large and solitary, or smaller and corymbose; involucral bracts in one series, united in a toothed cup or tube; receptacle flat, without scales; ligules of female ray flowers yellow or orange red; disk flowers tubular, 5-toothed; anther bases obtuse; style arms flattened, obtuse, usually hirsute; achenes linear, flattened; pappus scales or setae unequal.

Species 20; chiefly tropical American.

1. T. erecta Linn. Sp. Pl. 887, 1753. *DC.* Prod. 5; 643, 1836. *Miq.* Fl. Ind. Bat. 2; 84, 1856. *F. Vil.* Nov. App. 119, 1880. *Naves* in Fl. Filip. ed. 3; t. 404 bis, 1880. *T. patula Linn.* in *Blco.* Fl. Filip. ed. 1; 632, 1837: ed. 2; 440, 1845. *F. Vil.* Nov. App. 119, 1880.—An introduced species, commonly grown as an ornament. Leaves glabrous, pinnate, the linear lobes entire or sharply toothed. Heads erect, solitary, strongly scented, upon rigid peduncles, much exceeding the leaves; involucre cylindric, glabrous, united, crowned with short dentate teeth; ligules showy, orange red; tubular corollas of the same color, with its acute segments hairy on the upper surface; style arms slender, hairy tips usually recurved; achenes flattened, with wing like margins; pappus of 3 to 5 obtuse and unequal palea but occasionally one of them is awn like, usually united below the middle.

DISTRIBUTION:

Native to Mexico, and reported from Java.

LUZON:

Laguimanoc, Province of Tayabas, March 1905, *Merrill* 4019.

44. POROPHYLLUM VAIL.

Herbs, with alternate undivided leaves. Heads solitary, upon erect peduncles, homogamous, many flowered; corollas all discoid, slender, the short campanulate limb 5-toothed, yellow or purplish; involucre uniseriate; its 5 to 9 bracts oblong linear, acuminate, more or less united at the base; style arms subulate; achenes elongated, angular, often scabrous, apex attenuately beaked; pappus many seriate, pilose scabrous

Species about 25; mostly South American.

1. P. cacalioides Less. *DC.* Prod, 5; 650, 1836. *Miq.* Fl. Ind. Bat. 2; 84, 1856. *Klennia cacalioides Less.* in Linnaea 132, 1831. *Gynura cacalioides (Less.) F. Vil.* Nov. 120, 1880.—An erect herb. Leaves petiolate, oblong to ovate, fleshy, acuminate, margins with mucronulate teeth. Heads long peduncled racemose or subcorymbose; bracts 9, linear; apex of corolla slightly purple; tubular limb not distinct; style bases bulbose.

Both *DeCandolle* and *Miquel* report it from Luzon. Otherwise not known from the Philippines.

Distribution:

Java.

VII. ANTHEMIDEAE.

Leaves usually alternate. Heads heterogamous, rayed or disciform, or rayless or homogamous. Disk flower yellow; those of the rays variously colored. Involucral bracts 2 to many seriate, dry or with scarious tips. Receptacle naked or paleaceous. Anther cells not produced into tails. Style arms truncate. Pappus none or a crown of short palea.

Heads large, usually with many much elongated ligules.

45. CHRYSANTHEMUM.

Heads smaller, with fewer and rather short ligule.

Perfect flowers 4-merous.

Involucral bracts spreading when mature, uniseriate.

46. CENTIPEDA.

Involucral bracts becoming incurved, in several series.

47. SPHAEROMORPHAEA.

Perfect flowers 5-merous.

Achenes barely ribbed; pistillate flowers in one series.

48. ARTEMISIA.

Achenes strongly 5-ribbed; pistillate flowers in two series.

49. CROSSOSTEPHIUM.

45. CHRYSANTHEMUM LINN.

Mostly annual or perennial herbs, rarely shrubs, with alternate leaves, either entire, toothed, lobed, or pinnatifid. Heads heterogamous, large, terminal, long peduncled, or smaller and corymbose; ray flowers pistillate and fertile, its spreading ligule white, yellow or rosy; disk flowers perfect, also fertile, its tube terete or 2-winged and 4 to 5-toothed; involucre broad, bracts in many series, quite broad, appressed; receptacle naked; anther bases obtusely entire; style arms of disk flowers with truncate penicillate tips; achenes subterete or angled; pappus none or short and cup shaped.

Species about 140; chiefly in north temperate regions.

C. indicum Linn. Sp. Pl. 889, 1753. *Benth.* Fl. Hongk. 184, 1861. *F. Vil.* Nov. App. 119, 1880. *Forbes* and *Hemsl.* in Journ. Linn. Soc. Bot. 23; 437, 1888. *Pyrethrum indicum Cass.* in *DC.* Prod. 6; 62, 1837. *Miq*. Fl. Ind. Bat. 2; 86, 1856. *Matricaria chamomilla Blco.* Fl. Filip. ed. 1; 631, 1837. *Naves* in Fl. Filip. ed. 3; t. 329, 1880.—One meter high, suffrutescent and much branched. The young branches and the under surface of the leaves cottony pubescent. Leaves petioled, ovate, toothed or lobed or the larger basal ones pinnatifid, either acute or with mucronate teeth. Heads few, long peduncled, in short terminal racemes; involucre 1 cm. in diameter or more; the outer bracts herbaceous and pubescent, the inner ones completely scarious; rays showy, yellow.

DISTRIBUTION:

Native of China and Japan, and is extensively grown in green houses in most other countries. Both *Blanco* and *Villar* record it from the Philippines.

46. CENTIPEDA LOUR.

Herbs, with alternate usually toothed leaves. Heads small, heterogamous, lateral, or in short terminal racemes;

involucre in two subequal rows, with scarious margins; receptacle flat or somewhat convex, without scales; outer flowers many, pistillate, with short corolla tube; disk flowers perfect, fertile, with a broad campanulate tube, 4-lobed; anthers short, obtuse at base; style arms short and truncate; achenes 3 to 4-angled, without pappus.

Species 4; one indigenous to Chili, the others belong to the old world.

1. C. orbicularis Lour. Fl. Cochinch. 2; 493, 1790. *Miq.* Fl. Ind. Bat. 2; 89, 1856. *Hook.* Fl. Brit. Ind. 3; 317, 1881. *Mart.* in Nuov. Giorn. Bot. Ital. 15; 298, 1883. *Vid.* Phan. Cuming. Filip. 122, 1885: Rev. Pl. Vasc. Filip. 163, 1886. *C. minima (Linn.) Alex.* in *Lautr. u. Schum.* Fl. Deutsch. Schutz. Suds. 601, 1901. *King* and *Gamb.* Mat. Fl. Malay. Penin. 16; 46, 1905. *Cotula quinqueloba Blco.* Fl. Filip. ed. 1; 626, 1837. *Myriogyne minuta Less.* (*Loher* 3685.)—An herbaceous biennial, much branched and prostrate. Leaves small and numerous, glabrous or sparsely strigose, sessile, obovate, usually with a few teeth above the middle. Heads globose, sessile upon the stem and branches; bracts minute, persistent, with or without woolly hairs; corollas very minute, whitish; achenes elongated, usually somewhat incurved, finely strigose pubescent.

DISTRIBUTION:

Tropical Africa and Asia, Australia, Cochinchina and the Malayan Islands.

PHILIPPINES:

1836-41 *Cuming* 528 and 1264.

LUZON:

Manila, December 1903, *Hallier.*

Bayombong, Province Nueva Viscaya, May 1902, *Merrill* 308.

Bacolor, Province of Pampanga, May 1904, *Parker* 24.

47. SPHAEROMORPHAEA DC.

A prostrate perennial herb, with toothed alternate leaves. Heads subglobose, heterogamous, subsessile or shortly pedunculate in the leaf axils, disciform; outer flowers very numerous, fertile, slender corolla tube inflated below; disk flower tubular; corolla 4-cleft; involucre in several series, ovate and obtuse, ultimately becoming incurved; receptacle naked; anther bases entire; style arms bifid; achenes subcylindric, ribbed, without pappus.

Species 1; in India and on Siam.

1. S. russeliana DC. in *Deless.* Ic. Sel. 4; t. 49, 1839; Prod. 6; 140, 1837. *Hook.* Fl. Brit. Ind. 3; 317, 1881.—A much branched, sparingly introduced weed. Leaves punctate beneath, sessile, somewhat fleshy, glabrous or sparsely strigose, obovate, irregularly toothed. Heads usually in pairs from the leaf axils, one sessile the other pedunculate, more or less flattened; bracts chiefly glabrous, very unequal, persistent and closely set; flowers pale yellow; achenes rarely pubescent, but usually dotted with glistening glands.

In the Philippines this species occurs along the waysides in the turf forming grasses. Some authors place it under *Centipeda* from which it is distinguished by the unequal involucral bracts arranged in several series.

DISTRIBUTION:

On Siam and in India.

LUZON:

Caloocan, Province of Rizal, November 1903, *Merrill* 3655.

48. ARTEMISIA LINN.

Odorous herbs or shrubs, with alternate leaves. Heads heterogamous or homogamous, small, pendulous or erect, either in spikes, racemes or panicles; involucre oblong or hemispherical, its bracts imbricated; receptacle flat or convex, naked or pubescent; marginal flowers usually pistillate, their corollas 2 to 3-toothed; central flowers perfect, sometimes sterile; in some species all the flowers are perfect and fertile; anther entire at the base, often tipped with subulate appendages; achenes oblong 2-ribbed, usual with a pronounced disk; pappus none.

Species 200; chiefly in the northern hemisphere.

Receptacle glabrous.

Leaves pubescent beneath.

1. A. vulgaris.

Leaves glabrous.

2. A. parviflora.

Receptacle pilose.

3. A. absinthium.

1. A. vulgaris Linn. Sp. Pl. 848, 1753. *DC.* Prod. 6; 112, 1837. *Blco.* Fl Filip. ed. 1; 625, 1837: ed. 2; 435, 1845. *Miq.* Fl. Ind. Bat. 2; 87, 1856. *Benth.* Fl. Hongk. 187, 1861. *Naves* in Fl. Filip. ed. 3; t. 329, 1880. *Hook.* Fl. Brit. Ind. 3; 325, 1881. *Mart.* in Nuov. Giorn. Bot. Ital. 15; 298, 1883. *Forbes* and *Hemsl.* in Journ. Linn. Soc. Bot. 23; 446, 1888. *Lautr. u. Schum.* Fl. Deutsch. Schuts. Suds. 601, 1901. *Merr.* Govt. Lab. Publ. 27; 56, 1905. *King* and *Gamb.* Mat. Fl. Malay. Penin. 16; 47, 1905.—A bushy perennial herb, with striate or fluted stems and branches. Leaves large, numerous on stem and branches, canescent beneath, often strigose above, the lower ones broadly lobed, the middle ones 1 or 2 pinnately dissected, the uppermost entire and linear, the ultimate segments terminating in a sharp point. Heads subsessile, ascenging, subtended by bracts; bracts scariously margined subglabrous; marginal flowers few, its tube very slender, bearing a much exerted and deeply cleft style; inner flowers more numerous, perfect; its corolla tubular and pinkish, with short style branches; achenes glabrous.

Ditribution:

Temperate Europe and Asia, Siam, Java and China.

Luzon:

Laguimanoc, Province of Tayabas, March 1905, *Merrill* 4013.

2. A. parviflora Roxb. Hort. Beng. 61, 1814. *DC.* Prod. 6; 100, 1837. *F. Vil.* Nov. App. 119, 1880. *Hook.* Fl. Brit. Ind. 3; 322, 1881. *Rolfe* in Journ. Bot. 23; 213, 1885. *Vid.* Rev. Pl. Vasc. Filip. 163, 1886. *Ceron* Cat. Pl. Herb. 103, 1892.—A much branched perennial, with erect or ascending glabrous branches. Leaves sessile, linear ones with acute lobes toward the apex, broader ones rarely pinnatifid, usually glabrous. Heads short pedunculate, generally subpendulous, subtended by bracts; bracts glabrous, coriaceous, or only the inner ones with scarious margins, persistent; flowers 6 to 10, greenish; achene ellipsoid, smooth.

Our herbarium contains no specimens of this species, but since *Vidal* and *Rolfe* report it from the Philippines we can safely include it.

DISTRIBUTION:

Temperate regions of India.

3. A. absinthium Linn. Sp. Pl. 848, 1753. *DC.* Prod. 6; 125, 1837. *F. Vil.* Nov. App. 119, 1880. *Hook.* Fl. Brit. Ind. 3; 328, 1881.—Perennial and somewhat woody at the base, hoary pubescent. Leaves ovate to obovate, unequally 2 to 3-pinnatifid, canescent on both surfaces, the lower ones narrowed into winged petioles. Heads pedunculate, hemispheric, in drooping secund racemes terminating the branches; outer bracts canescent, oblong, with narrow scarious margins, inner ones orbicular and broadly scarious; hairs of receptacle long; corollas yellow; achene oblong or obovoid.

Villar reports to have seen this species growing in some of the Manila gardens.

DISTRIBUTION:

Northern Asia, Affghanistan and westward to the Atlantic.

49. CROSSOSTEPHIUM LESS.

Woody, generally much branched, with many alternate leaves. Heads numerous, usually in a spicate raceme, heterogamous; involucre campanulate, its bracts in several series; receptacle naked and conical; corolla of outer pistillate flowers filiform, the central ones fertile and 5-dentate; achene angular, whith short unequal paleaceous pappus.

Species 1; China, Japan and the Malayan region.

1. C. artemisioides Less. in Linnaea 6; 220, 1831. *DC.* Prod. 6; 127, 1837. *Miq.* Fl. Ind. Bat. 2; 89, 1856. *F. Vil.* Nov. App. 119, 1880. *Forbes* and *Hemsl.* in Journ. Linn. Soc.

Bot. 23; 440, 1888. *Ceron* Cat. Pl. Herb. 103, 1892. *Hayata* in Journ. Coll. Sci. Tokyo 18; Art. 18, 24, 1904.—Perennial. with canescent stems. Leaves densely canescent on both sides, long attenuate, obtusely 3-lobed at apex, crowded at the ends of the sterile twigs, the older ones deciduous Heads erect, pedunculate, in leaf axils or subtended by entire leaf like bracts; bracts densely lanose pubescent, unequal; outer flowers in a few rows only; style arms strongly recurved; achenes obovoid, conspicuously ribbed; palea of the pappus acute, persistently terminating the hyaline ribs.

Distribution:

Japan and China.

Philippines:

1894-5 *Marave* 177.

Marinduque:

1903, collector unknown.

VIII. SENECIONEAE.

Leaves usually alternate. Heads heterogamous, rayed or disciform. Involucral bracts usually uniseriate and subequal, with a few short outer ones at the base, rarely many seriate. Disk flowers yellow; the rays usually yellow. Anther cells obtuse below or with two short points, rarely tailed. Style arms of perfect flowers truncate or appendaged. Pappus of fine hairs.

Heads homogamous.
  Bracteoles small or leaf like.
    50. GYNURA.
  Bracteoles obsolete.
    51. EMILIA.
Heads heterogamous.
  Flowers yellow or purple.
    52. SENECIO.
  Flowers pink or whitish.
    53. ERECHTHITES.

50. GYNURA CASS.

Hispid or glabrous succulent herbs, rarely undershrubs. Leaves alternate, entire, toothed or pinnatifid. Heads homogamous, solitary or corymbose; flowers all disciform, yellow or purplish, perfect or rarely with a few pistillate outer ones, its tube 5-toothed; involucre cylindric or subcampanulate; bracts narrow, scariously margined, subtended by leaf like basal ones; receptacle flat, pitted or fimbriate; bases of anthers subauricled; style arms slender, with hispid subulate tips; achenes narrow, many costate; pappus white, copious·

Species 24; African and Asiatic.

Stipules broadly auriculate.

Leaves oblanceolate, base attenuate.

1. G. vidaliana.

Leaf unequally lobed, its base broadly truncate.

2. G. latifolium.

Leaf coarsely dentate, its base cuneate.

3. G. clementis.

Stipules absent or not auricled.

Inflorescence rigidly corymbose.

4. G. angulosa.

Inflorescence racemosely paniculate.

5. G. sarmentosa.

1. G. vidaliana Elm. *G. purpurascens Vid.* Rev. Pl. Vasc. Filip. 164, 1886. *Ceron* Cat. Pl. Herb. 104, 1892.—Perennial herb, erect or branched. Leaves oblanceolate, 20 cm. long, 8 cm. in width, coarsely toothed or merely apiculate toward the attenuate base, strigose on both sides, rather thick and somewhat purplish beneath; stipules distinctly pediceled, 2 to 3-toothed. Heads large, few, upon slender bracteate peduncles; bracts strigose, the inner ones scariously margined, the basal ones foliaceous; flowers deep yellow, much exceeding the involucre; receptacle slightly fimbriate; achene cylindric, 10-costate, often pubescent, terminated by a short scarious rim; pappus white, silky, usually shorter than the corollas.

Since the name *Gynura purpurascens* has been previously used by *DeCandolle* it is invalidated for *Vidal's* species, and accordingly this new name is proposed.

LUZON:

Mount Arayat, Province of Pampanga, October 1904, *Merrill* 3937.

2. G. latifolium (Moore) Elm. *Crassocephalum latifolium Moore* in Journ. Bot. 43; 141, 1905.—Scandent, glabrous. Leaves broadly ovate, acute, base broadly truncate, rarely with obscure cordate margins, unequally lobed, not at all dendate, the lobes acutely or obtusely dentate, thin but somewhat fleshy; petioles elongated with 2 auriculate stipules at the base. Heads homogamous, campanulate, solitary from the axils or in terminal corymbs; peduncles very long, bracteate; involucral bracts linear lanceolate, obtuse, 2 to 6-nerved, basal ones short and very narrow; flower exerted, with slender corolla tube deeply lobed; achenes rough, 5-striate, glabrous; pappus bristles scabrous, white.

NEGROS:

Collected by *Whitehead*.

3. G. clementis Merr. in Philip. Journ. Sci. 1, Suppl. 3; 244, 1906.—Herbaceous, subscandent. Stems subterete, its branches covered with short crisp brown hairs. Leaves 6 cm. long including the 1 cm. long petiole, 3 cm. wide, oblong to elliptic obovate, obtuse, cuneate at the base, coarsely dentate especially around the apex, subcoriaceous, equally strigose pubescent on both sides, alternate; stipule similar to the leaves in texture and pubescence, orbicular, larger ones 1 cm. in diameter, subentire. Peduncles slender, terminal or from the upper axils, brown pubescent, bearing toward the apex 5 to 9 heads; pedicels slenderly flexuose, pubescent, bracteate; heads 1 cm. long, turbinate, about 30-flowered; involucre 2-seriate; the basal bracts short and linear; the upper ones equal, 7 mm. long, with purple tips and straw colored membranous margins, acute, short brown pubescent on the exposed outer surface; slender tubular corolla 1 cm long, thickened at the base, the apex deep purple and subcampanulate; segments 5, narrowly acute, 2 mm. long; anthers subsessily inserted upon the base of the campanulate portion of the tube, 2.5 mm. long, with acute apices; style purple, much exerted, cleft into 2 flattened somewhat recurved arms; achenes 3 mm. long, slender, finely ciliate when young; pappus copious, soft, silky white, 8 mm. long, equal.

It is closely related to the Formosan *G. elliptica Yabe* et *Hayata*.

MINDANAO:

Lake Lanao, Camp Keithley, January 1905, *Mrs. Clemens* 49.

4. **G. angulosa DC.** Prod. 6; 298, 1837. *F. Vil.* Nov. App. 119, 1880. *Hook.* Fl. Brit. Ind. 3; 334, 1881. *G. finlaysoniana DC.* in *F. Vil.* Nov. App. 120, 1880. *Cacalia sarrasenica Blco.* Fl. Filip. ed. 1; 618, 1837. *Senecio cacaliaster Blco.* l. c. ed. 2; 441, 1845.—A climbing herb, with striate stems and branches. Upper leaves short petioled, ovate, acuminate, glabrous above, slightly pubescent on the nerves be, neath, entire or remotely apiculate, usually subtending a few axillary leaflets. Inflorescence rigidly corymbose, short pubescent; heads solitary, upon strong erect peduncles; bracts sharply acuminate, unequal, the basal ones spinescent, all chartaceous, glandularly pubescent, the upper ones 3-nerved; corollas purplish; achenes obovoid, hispidly pubescent; pappus bristles finely scabrous, dull white, a short basal series in addition to the main series.

DISTRIBUTION:

India.

PARAGUA:

Point Separation, February 1903, *Merrill* 793.

5. **G. sarmentosa DC.** Prod. 6; 298, 1837. *Miq.* Fl. Ind. Bat. 2; 97, 1856. *F. Vil.* Nov. App. 120, 1880. *Hook.* Fl. Brit. Ind. 3; 335, 1881. *Mart.* in Nuov. Giorn. Bot. Ital. 15; 299, 1883. *Vid.* Phan. Cuming. Filip. 122, 1895: Rev. Pl. Vasc. Filip. 163, 1886. *Ceron* Cat. Pl. Herb. 103, 1892. *Curtiss.* Bot. Mag. 3; t. 50, 7391, 1894. *King* and *Gamb.* Mat. Fl. Malay. Penin. 16; 39, 1905. *G. affinis Turcz.* in *F. Vil.* Nov. App. 120, 1880. *G. scaber Turcz.* in *F. Vil.* Nov.

App. 180, 1880.—A glabrous branched and climbing herb. Leaves short petioled, ovate lanceolate or elliptic, entire or remotely apiculate, membranous, conspicuously nerved, sparsely pubescent beneath, without stipules. Racemes in terminal rounded clusters; peduncles not rigid, bearing solitary heads; bracts distinct, chartaceous, sharply acuminate, the basal ones short and spinescent, corollas purplish; pappus bristles scabrous, yellowish white, the basal series one third the length of the longer series, all subpersistent upon an expanded rim; achenes strigose.

Distribution:

Siam and Java.

Mindanao:

Todaya, Province of Davao, April 1904, *Copeland* 1258.

51. EMILIA CASS.

Annual or perennial herbs, glaucous, glabrous or hairy. Leaves radically crowded, entire, toothed or lyrately pinnatifid, the cauline stem clasping. Heads homogamous, long peduncled, solitary or loosely corymbose; involucre cylindric, without basal bracts; receptacle flat, naked; flowers yellow or red, all perfect, fertile tubular limb 5-toothed; tips of style arms short, obtuse or acute; achenes nearly terete, 5-ribbed; pappus bristles soft and white.

Hoffman in Die Naturlichen Pflantzenfamilien considers *Emilia* a section of *Senecio*, which portion however has heterogamous heads *Emilia* can be further distinguished from *Gynura*, its nearest ally, by the absence of basal bracts.

Species 5; African and Asiatic.

Lower leaves chiefly orbicular and entire.

1. E. humifusa.

Lower leaves chiefly lyrately lobed.

2. E. sonchifolia.

Lower leaves chiefly oblong and entire or toothed.

3. E. flammea.

Lower leaves chiefly pinnatifid.

4. E. pinnatifida.

1. E. humifusa DC. Prod. 6; 302, 1837.—Erect herbs, 20 cm. high, with glabrous stems scapose or branched near the base. Leaves mostly radical, the blade orbicular, with or without small lobes along the usually winged petiole, subglabrous; cauline few, clasping. Heads solitary, upon glabrous peduncles; its bracts linear, hyaline margined, united at the base, persistent, reflexed in age; flowers pink, equalling the bracts; achenes finely pubescent along the ribs; pappus easily separating, silkily white.

These specimens we refer under the above name with much doubt, since that species has hitherto only been reported from tropical Africa on the island of Zanzibar. If our specimen should prove distinct I propose the name *E. marivelense.*

DISTRIBUTION:

Zanzibar.

PHILIPPINES:

1894-5, *Marave* 74.

LUZON:

Mount Mariveles, Province of Bataan, October 1903, *Merrill* 3282.

2. E. sonchifolia (Linn.) DC. Prod. 6; 302, 1837. *Miq.* Fl. Ind. Bat. 2; 101, 1856. *F. Vil.* Nov. App. 120, 1880. *Naves* in Fl. Filip. ed. 3; t. 282, 1880. *Hook.* Fl. Brit. Ind. 3; 336, 1881. *Mart.* in Nuov. Giorn. Bot. Ital. 15; 300, 1883. *Vid.* Phan. Cuming. Filip. 122, 1885: Rev. Pl. Vasc. Filip. 164, 1886. *Forbes* and *Hemsl.* in Journ. Linn. Soc. Bot. 23; 449, 1888: *Merr.* Govt. Lab. Publ. 27; 56, 1905. *Hayata* in Journ. Coll. Sci. Tokyo 18; Art. 8, 26, 1904. *King* and *Gamb.* Mat. Fl. Malay. Penin. 16; 38, 1905. *Cacalia sonchifolia Linn.* in *Blco.* Fl. Filip. ed. 1; 618, 1837.—Herbaceous, 4 dm. high, usually branched from below the middle. Leaves mostly cauline and lyrately lobed, the terminal lobe often ovately triangular and coarsely toothed; the petioles usually winged, glabrous on both sides, somewhat fleshy, the upper leaves clasping. Heads upon slender peduncles; bracts glabrous, united at the base, scariously margined, linear; flowers equalling the bracts, pink; achenes flattened, finely scabrous along the ribs; pappus silkily white, easily detached.

DISTRIBUTION:

Warm countries of Africa and Asia, Japan and introduced in America.

LUZON:

Mount Arayat, Province of Pampanga, October 1904, *Merrill* 3920.

Carronglang, Province of Nueva Viscaya, May 1902, *Merrill* 275.

Malapadnabate, Province of Rizal, June 1903, *Merrill* 2740.

Mount Mariveles, Province of Bataan, June 1904, *Whitford*.

Subig, Province of Zambales, January 1904, *Hallier*.

PANAY:

Iloilo, January 1904, *Copeland* 119.

3. E. flammea Cass. Dict. Sc. Nat. 10; 14, 1826-34. *F. Vil.* Nov. App. 120, 1880. *Hook.* Fl. Brit. Ind. 3; 636, 1881. *Forbes* and *Hemsl.* in Journ. Linn. Soc. Bot. 23; 449, 1888. *E. sagittata DC.* Prod. 6; 302, 1837. *Miq.* Fl. Ind. Bat. 2; 101, 1856.—Herbs 20 cm. high, branched below the middle. Leaves ample, entire or obscurely toothed, lanceolate to obovate, the lower ones with winged petioles, the upper ones clasping, subglabrous on both sides or hirsutulous beneath. Heads solitary upon the rather numerous erect peduncles; bracts glaucous, united at the base, linear, scariously margined, persistent, ultimately reflexed; flowers pink, slightly exceeding the involucre; achenes finely pubescent along the ribs; pappus dense, white, silky.

DISTRIBUTION:

India and in the Malayan Archipelago.

MINDORO:

Puerto Galera, October 1903, *Merrill* 3318.

MINDANAO:

Cottabato, May 1904, *Copeland* 10.

BASILAN:

January 1904, *Hallier*.

4. E. pinnatifida Merr. in Philip. Journ. Sci. 1, Suppl. 3; 243, 1906.—Biennial herbs with very short branched leafy stems. Scapes one to half a dozen or more from the same individual, the middle one erect, the others usually curved near the base, terete, smooth, 1 to 5 cm. high, the longer ones commonly branched from the middle and rebranched toward the apex. Leaves alternate, sessile, the semiclasping base toothed or with broad lobes, 3 to 5 cm. long, the broader ones lyrately pinnatifid, the linear ones toothed or only slightly pinnatifid, glabrous above, dirty white and scabrously pubescent beneath, succulent. Heads turbinate, 1 to 1.5 cm. long, the younger ones upon slender half drooping peduncles; involucral bracts equal, 1 cm. long, linear to lanceolate, acute, glabrous, united at the base, with narrow scarious margins; flowers many, tubular, pink, 9 mm. long, the basal portion knob like, gradually expanded toward the apex, the segments linear and 2 mm. in length; anthers included, linear, 3 mm. long; achene 2 to 3 mm. long, 5-costate, equal in diameter throughout, finely strigose along the edges; pappus soft, silky white, 5 mm. in length, ample, deciduous:

Common in grassy alpine regions of open pine forests, and apparently is intermediate between *E. sonchifolia DC.* and *E. flammea Cass.*

LUZON:

Baguio, Province of Benguet, June 1904, *Elmer* 6599 and 6606.

Bugias, Province of Benguet, October 1905, *Merrill* 4664.

52. SENECIO LINN.

Chiefly annual or perennial herbs (a few tropical species shrubby or even arborescent), with basal and alternate leaves. Inflorescence corymbose or paniculate; heads heterogamous, yellow or purple, with tubular and ligulate or only tubular flowers; involucre cylindric, its bracts distinct or united at the base; receptacle flat, mostly naked, often honeycombed; ligulate flowers when present pistillate and fertile; disk flowers perfect, fertile, tubular corolla 5-segmented; anther bases entire or slightly sagittate; style arms spreading or recurved; achenes terete, or the ligulate somewhat compressed; 5 to 10-ribbed, papillose or canescent; pappus of many capillary bristles.

It is not only the largest genus of the *Compositae* but the largest in species of all the Phaenogamous plants. Its geographical distribution is universal throughout the globe. They are ubiquitous,—in the tropics as well as in the arctics, in the mountains and in the deserts, on borders of streams, along seacoast, in swamps—everywhere these denizens are met. They are most varied and abundant in the temperate regions. None of them have a wide area, but most of them are rather abundant in their confined limits. A few of the extreme northern species are common to both the old and new worlds. This genus has over 1200 more or less localized species whose center of geographical distribution is in the high latitudes of the northern hemisphere and in the alpine regions of southward extending mountains. Notwithstanding the fact that over 40 generic names have been proposed fron time to time for different sections, still the entire group remains intact and forms indeed a closely related series.

Leaves obovate, irregularly toothed or lobed.

1. S. benguetense.

Leaves otherwise.

Flowers yellow.

Leaves linearly triangular, acuminate.

2. S. confusus.

Leaves broadly lanceolate, acute.

3. S. luzoniensis.

Flowers purplish.

Leaves cordately ovate.

4. S. rubiginosus.

Leaves lanceolate.

5. S. mindoroensis.

1. S. benguetense n. sp.—An erect perennial herb, 1 m. high, sparingly branched below the middle; stem and branches striate, woolly pubescent. Leaves membranous, alternate, ascending, 10 to 15 cm. long, 5 to 7 cm. wide, obovate in outline, irregularly lobed, the lobes obscurely dentate and terminating into black callous tips, the veins prominent beneath and lateral ones usually forked above the middle, its lower surface soft with pale yellow hairs, upper surface less pubescent, apex rounded, base long attenuate, tha basal pair of small lobes often enlarged and forming semiclasping stipules. Inflorescence a spicate thyrse; the larger branches subtended by leaf like bracts, those subtending the peduncle and pedicels minute, all covered with a short yellowish brown pubescence; heads solitary upon 5 mm. long pedicels, rather scattering, turbinate or subcampanulate, 8 mm. long, fully that in diameter across the top; involucral bracts in several series, acute or obtuse, linear, brown and scarious, mostly glabrous, the margins as well as the upper median line finely ciliate; receptacles bearing short silky hairs; ray flowers 3 to 5 in number, 8 mm. long; its corolla tubular, thickened at or toward the base, the upper 2 mm. campanulate and ultimately divided into 5 acute recurved segments; style entire, not exerted, articulate at the base to a projected pedicel; syngenecious anthers easily separated from the long slender filaments, 2 mm. long, acute, basal lobes finely setose; style clavate, with the stigmatic portion exerted; disk flowers numerous; corolla 5 mm. long, filiform, tubular for its entire length, terminated by 3 short erect segments; stamens abortive or wanting; style much exceeding the corolla, deeply cleft into slender recurved forks; achenes nearly 2 mm. long, short pubescent, 7-costate, upon a smooth rounded callous base, those of the disk flowers slightly longer and usually curved; pappus of both kinds of flowers similar, 5 mm. in length, dull white and finely scabrous.

Type specimen 6247, *A. D. E. Elmer* collected near an exposed cliff on the north side of Mount Santo Tomas, Province of Benguet, Luzon, May, 1904, at an altitude of 2,500 meters.

2. **S. confusus n. sp.**—A perennial herb, creeping or reclining upon thickets; slender stems and main branches the size of a small finger, striate, smooth and green; younger banches distant and alternate. Leaves glabrous, thin, membranous, early falling, linearly triangular, 4 to 6 cm. long, 1 cm. wide at the usually acute base, subentire or irregularly dentate below the middle, apiculate toward the long acuminate apex, midvein prominent, lateral veins reticulate; petiole 7 mm. long, slightly expanded at the base. Inflorescence paniculate or subcorymbose; peduncles glabrous, setaceously bracteolate, dichotemously branched; pedicels also glabrous, 1 cm. long; heads few, distant, 8 mm. long, fully as wide across the top, turbinately or subcampanulately spreading; involucral bracts mostly in one series, glabrous, the longer ones acute, 3-nerved, with narrow whitish margins, the few basal ones similar to the pedunculate bracts; ray flowers not numerous, bright yellow; ligulate 10 mm. in length; tube 3 mm. long; ligule proper 4 mm. long, narrowly elliptic, 3-nerved, apex rounded or obscurely 2 to 3-toothed; the 2-cleft style arms barely exerted; disk flowers 7 mm. long, tubular, terminating into 1 mm. long acute and turbinately spreading segments; anthers narrowly linear, apex acute, basifixed, obscurely auricled; filaments inserted upon the throat, nearly twice as long as the anthers, with a conspicuous knob like expansion immediately beneath the anthers; achenes nearly equal, slender, 3 mm. long, set with white hispid hairs along the 3 to 5 ridges, its apex bearing a conspicuous rim like projection; style cleft into recurved arms, apex rounded; pappus fine, silky white, becoming easily detached.

This characteristic species 5871, *A. D. E. Elmer* was collected along the edges of shrubberies near streams at Baguio, Province of Benguet, Luzon, March, 1904. It is related to *S. scandens Don*, but our specimen has not the climbing habit of the latter; is wholly glabrous; the leaves are not hastate nor are their petioles auricled; and with fewer heads forming a totally different inflorescence. It is probably the same as *S. scandens Don* reported from the Province of Lepanto by *Vidal* Rev. Pl. Vasc. Filip. 164, 1883.

3. S. luzoniensis Merr. in Philip. Journ. Sci. 1, Suppl. 3; 245, 1906.—Erect, perennial herb, 1 to 1.5 m. high. Stems stout, terete, glabrous, branched toward the inflorescence. Leaves subcoriaceous, entire or crenately toothed, alternate, 1 dm. long or the smaller ones less in length, about 2 cm. wide, acute, the lower surface somewhat paler, its margins becoming strongly recurved, midvein very prominent beneath, the sides reticulately nerved, lanceolate or oblong lanceolate, with a 6 to 10 mm. long petiole or the upper cauline leaves subsessile. Inflorescence a corymbose panicle, 1 to 2 cm. broad; its branches glabrous, subtended by small foliaceous bracts; peduncles 1 to 2 cm. long, straight, bracteate; heads turbinate, 1.5 cm. high, 1 cm. in diameter excluding the ligules; involucre 8 mm. long, chiefly 1-seriate imbricate; lanceolate bracts brown with yellowish scarious margins, acute; basal bracts minute, acuminate, also glabrous; ray flowers 6; its ligule oblong, 10 mm. long, 3 mm. wide, 4-nerved, terminated by 3 blunt teeth, bright yellow; corolla of disk flower tubular, 7 mm. long, glabrous, the base tumid, the upper one third yellow and tubularly inflated, bearing 5 minute reflexed segments; anthers slender, 3 mm. long; style slightly exerted, 2-cleft, its arms truncate and 1.5 mm. in length.

LUZON:

Soyoc to Panai, Province Benguet, November 1905, *Merrill* 4791.

4. S. rubiginosus n. sp.—A succulent suffrutescent creeper or subcandent in thickets; branches alternate, densely brown pubescent, much branched towards the ends. Leaves alternate, the larger ones 6 cm. across, 10 cm. long including the slender 3 cm. long petiole, usually triangular though the smaller ones vary from ovate to even lanceolate, most of them are borne on short axillary branches, both surfaces pubescent with short rufous brown hairs, margins coarsely dentate. Inflorescence corymbose, its branches rather long and stout, densely covered with a soft brownish pubescence; pedicels 1.5 cm. long, widely spreading, subtended by linear and similarly pubescent bracts; heads turbinate, 2 cm. long, nearly that in diameter, solitary; bracts chiefly of one series, rather straight or with age the tips becoming recurved, frequently with a few scattering basal ones, linear, broadest at the base, obtuse, with yellowish glabrous margins, the middle portion thick and obscurely nerved, purple red especially toward the apex, covered with a rusty lanose pubescence especially toward the base; flowers about 30 in number, all tubular; receptacle short paleaceous; corolla 15 mm. long, slenderly tubular, the upper one third more or less expanded and ultimately divided into 5 roundish acute segments; anthers 2 mm. long, apex acute, base truncate or obscurely auricled; filaments equal in length, the distal portion thickened and whiter in color; style much exerted, deeply cleft; its arms subcompressed, acute, papillose, stigmatic around the entire forks and nearly to their bases; achenes 2.5 mm. long, nearly terete, striate or obscurely costate, the base with an obscure callous rim; pappus fine, silky white, copious, 1 mm. long, separating from the white rim like callous.

Type specimen 6246, *A. D. E. Elmer*, collected near the summit of Mount Santo Tomas, Province of Benguet, Luzon, May, 1904, at an approximate altitude of 2,500 meters. This species is separated from its nearest ally, *T. walkeri Arn.*, by its obscurely cordate leaves which are not glabrous above nor floccosely aracnoid beneath; and by the much more numerously flowered heads not being discoidal.

5. S. mindoroensis n. sp.—A suffrutescent species, creeping or reclining upon thickets; stems glabrous and much branched; branches alternate, entirely glabrous. Leaves succulent, perfectly glabrous on both sides, alternate, lanceolate, subentire or remotely denticulate, larger ones 7 cm. long, 2 cm. wide, apex long acute, base usually short acute, with a 1 cm. long petiole. Inflorescence paniculate or subcorymbose; pedicels grabrous, slenderly flexuose, bracteolate above the middle especially beneath the flower; heads turbinate 15 mm. long, nearly that in width at the top, about 15-flowered; involucre uniseriate; its long erect bracts linearly tapering from the base, brown, acute, 3-nerved, with whitish margins and with the glabrous basal ones short and spreading; receptacle glabrous; flowers all alike, tubular, 25 in number, 18 mm. long; corolla 11 mm. long, the upper 3 mm. somewhat expanded and halfway divided into 5 acute or acuminate segments; anthers 2 mm. long, apex acuminate, base truncate or obscurely auricled; filaments slightly shorter, separately inserted upon the throat of the expanded corolla tube; style much exerted; the two arms subcompressed, short hairy on the exterior above the middle; achenes 4 mm. long; striate, of the same thickness throughout, the base with a whitish rim like callous; pappus of dense fine silky white 10 mm. long bristles, ultimately separating from the small callous rim of the achene.

Type specimen 5936, *A. D. E. Elmer*, discovered in dry sparsely thicketed places near Baguio, Province of Benguet, Luzon, March, 1904. It is distinguished from *S. vagans Wall.* by its much larger and broader flowers, more numerous involucral bracts; and by the absence of ligulate corollas.

MINDORO:

Baco River, April, 1903, *Merrill* 883.

LEYTE:

Palo, January 1906, *Elmer* 7041.

53. ERECHTHITES RAF.

Erect, usually branching herbs, with alternate leaves. Inflorescence corymbose or paniculate; heads heterogamous, its flowers all discoid, either pink or whitish; involucre cylindric, swollen at the base, its principal linear bracts with or without basal ones; receptacle naked, concave; marginal flowers in two or more series, fertile with filiform corollas 2 to 4-toothed; central ones perfect, 4 to 5-toothed; style arms elongated; anthers obtuse at base; achene oblong, striate; pappus of copious soft white bristles.

Species 12; chiefly of the southern hemisphere.

1. E. petiolata Benth. in Fl. Hartweg. 209, n. 1116, 1839-57. *E. valerianaefolia Miq.* Fl. Ind. Bat. 2; 97, 1856.—Stems erect, glabrous. Upper leaves petioled, pinnately parted, oblanceolate in outline, the segments sharply toothed, glabrous or subscabrous on both surfaces. Heads in compact spicate corymbs, upon slender bracteate peduncles; main series of bracts subtended by linear basal ones; flowers exceeding the involucre; achenes subterete, cylindric, sparsely strigose, 10-ribed; pappus very dense, equalling the corollas, deciduous, whitish below the middle, the exposed portion pinkish red.

Mindanao:

Mount Apo, Province of Davao, May 1903, *DeVore* and *Hoover* 286.

V. HELIANTHEAE.

Heads usually radiate. Receptacle paleaceous. Anther cells not produced into tails. Style arms truncate or appendiculate, or style of sterile flowers entire. Achenes 3 to 4-angled or terete or compressed. Pappus of 2 to 4 bristles or paleaceous or none.

Heads many flowered; perfect flowers sterile with undivided styles; receptacle paleaceous all over.

Ligules of the ray flowers persistent and falling with the achenes.

27. ZINNIA.

Ligules of the ray flowers none or deciduous.

Achenes short and thick; pappus none.

28. MELAMPODIUM.

Achenes dorsally compressed; pappus paleaceous.

29. CHRYSOGONUM.

Heads heterogamous or homogamous; perfect flowers all fertile; achenes of the disk angled, subterete or laterally compressed, crowned with 2 to 3 bristles or scales or naked.

Inner involucral bracts embracing the achenes.

Outer involucral bracts 5, glandular.

30. SIEGESBECKIA.

Outer involucral bracts 4, broad, in opposite pairs.

31. ENHYDRA.

Inner involucral bracts not embracing the achenes; palea of receptacle flat, narrow.

32. ECLIPTA.

Inner involucral bracts not embracing the achenes; palea of receptacle concave, embracing the achenes.

Ray flowers with small ligules; achenes not winged.

33. BLAINVILLEA.

Ray flowers with large yellow ligules; achenes thick.

34. WEDELIA.

Ray flowers with white or yellow ligules; achenes ciliate.

35. SPILANTHES.

Ray flowers neutral with yellow ligules; achenes 4-angled.

36. HELIANTHUS.

Heads heterogamous or homogamous; perfect flowers all fertile or neuter; achenes dorsally compressed, 2 to 4-awned or naked.

Involucre single.

37. SYNEDRELLA.

Involucre double.

Pappus of 2 fimbriate awns, scales or teeth or a mere border or wanting.

Appendages of style arms of perfect flowers none or very short.

38. COREOPSIS.

Appendages of style arms of perfect flowers long.

39. DAHLIA.

Pappus of 2 to 6 awns or teeth, upwardly or downwardly barbed or hispid.

Achenes beakless; ray flowers with yellow or white ligule or wanting.

Style arms with short appendages; achenes usually 2 to 4-awned.

40. BIDENS.

Style arms with long appendages; achenes with 2 bristles.

41. GLOSSOGYNE.

Achenes beaked; ray flowers with purple or rose red ligules.

42. COSMOS.

27. ZINNIA LINN.

Annual or perennial herbs, with sessile opposite or whorled leaves. Heads heterogamous, with pistillate ligulate flowers; those of the disk tubular, 5-segmented, perfect; involucre imbricate, its bracts ovate to rotund, with blackish margins; receptacle subconical; ligule red or yellow, coriaceous, reticulate, obovate, subpersistent; scales oblong, conduplicate, surrounding the disk flowers; cortex of achenes membranous, the outer ones triquetrous, the inner ones compressed with or without pappus awns.

Species 12; in Arizona, Texas and especially in Mexico.

1. Z. elegans Jacq. Coll. 3; 152, 1789. *DC.* Prod. 5; 536, 1836. *F. Vil.* Nov. App. 117, 1880.—A much branched erect hirsute herb. Leaves sessile, cordately ovate. Heads upon elongated peduncles, solitary; involucre cylindrical, its bracts ovate, the upper ones with blackish margins; apex of scales pectinately fringed, acuminate; achene of the disk blunt or subbidentate.

Of this species we have no specimens in hand, but *Villar* reported it from Luzon, Panay and Cebu. It is cultivated for ornamental purposes, and was probably introduced from Mexico.

28. MELAMPODIUM LINN.

Annual or perennial herb, rarely shrubby. Leaves opposite, often narrow, either entire, toothed or pinnatifid. Heads medium sized, sometimes conspicuously radiate; involucre double, the basal 5 bracts flat and partly united, the inner series embracing an achene and deciduous with it; receptacle convex or subconic; flowers heterogamous, the ray fertile and bearing yellowish white ligules; the disk perfect but sterile; anthers entire at base; achenes slightly incurved, cuneate; pappus none.

Species 25; mostly tropical American.

Leaves oblong, entire. **1. M. sericeum.**

Leaves ovate, dentate. **2. M. divaricatum.**

1. M. sericeum Lag. Elench. Hort. Madr. 1805: Gen. et Sp. Nov. 32, 1816. *DC.* Prod. 5; 518, 1836. *F. Vil.* Nov. App. 117, 1880.—Annual, numerously branched from the base, with strigose stems and branches. Leaves opposite, sessile, thin, lanceolate or ovate in outline and sinuately toothed or lobed, nearly glabrous above, beneath covered with long adpressed hairs. Heads solitary upon slender trigose terminal or axillary peduncles; bracts 5, plane, pubescent, ovate, nerved, not enclosing the ray achenes; marginal flowers 5 to 7, pistillate and fertile; style arms cleft, flattened at the base, recurved at the apex; ligules subelliptic, yellow, abruptly contracted into a short stipe which is articulated to the ventral side of the achene apex; achenes obovoid, transversely rugose, bearing upon its dorsal apex a persistent oblique cartilaginous crown terminating into a recurved awn; disk of sterile flowers upon an elongated receptacle, subtended by conduplicate hyaline bracts with a triangular obscurely fringed appendage; corolla tubular, minutely 5-toothed; style bearing an entire clavate stigma; anthers 5.

We consider our specimen an introduced species from Mexico and agree with *Villar's* identification. *M. diffusum Cass.* as well as *M. manillense Less.* are undoubtedly synonyms.

PHILIPPINES:

1894-5 *Marave* 187.

2. M. divaricatum (Rich.) DC. Prod. 5; 520, 1836. *Hoff.* in Die Nat. Pflantzenf. 4; 218, 1897. *Dysodium divaricatum Rich.* in *Pers.* Ench. 2; 489, 1807.—Stems herbaceous, dichotemous, pilose. Ovate leaves acuminate, base cuneate, coarsely dentate, scabrous above, hispid beneath. Peduncles of dichotemous heads glabrous, often exceeding the leaves; outer involucral bracts 5, obovate, base united; achenes compressed, rugose, apex truncate and externally obscurely dentate; ligule short, 3-toothed.

There are no specimens in the herbarium, but we do not doubt that this widely distributed species occurs within our region.

29. CHRYSOGONUM LINN.

Caulescent perennial herbs, with opposite (in ours alternate) pubescent leaves. Heads heterogamous, solitary, corymbosely arranged, yellow; marginal flowers ligulate, fertile; disk flowers perfect, sterile, tubular limb elongated and 5-toothed; involucre ovoid, its bracts rather rigid; receptacle flat, set with persistent concave scales; anther bases subsagittate; style of disk flowers undivided, hairy; ray achenes dorsally compressed, margins acute, 1-ribbed on the back, 1 to 2-ribbed on the inner face; pappus a half cup shaped crown or none.

Species about 7; one American, two Indian, three Australian and the following:

1. C. philippinense n. sp.—Evidently a terrestrial, annual or biennial, erect, about 6 dm. tall; stems covered with a dense brownish yellow lanate pubescence. Leaves alternate, rather ample on the stems, upon 1 cm. long pubescent petioles, membranous, strigosely pubescent on both sides but more especially along the nearly parallel veins beneath, apex rounded or obtuse, base cuneate or truncate, 5 cm. long, 2 cm. wide, oblong to linear ovate, coarsely and repandly toothed. Inflorescence a few branched racemes, the lower branches longest and equalling the central ones, densely yellowish pubescent, leaf bracteolate; heads solitary, 15 mm. in diameter, 1 cm. high, ovoid, subcampanulate; bracts of the involucre densely woolly, 1 to 3-seriate, subequal in length; ligulate flowers few, female subtended by 1 cm. long bracts; corolla yellow, the 2 mm. long glabrous ligule gradually expanding into the spatulate or oblanceolate 3-toothed ligule proper; central flowers many, yellow, each subtended by a palea; the rigid palea linearly acuminate, conduplicate, hyaline margined, usually also with a conspicuous hyaline keel which as well as the lateral edges are scabrous toward the apex; corolla tubular and enclosed in and similarly curved with the palea, its 5 yellow segments short and obtuse; anthers 1.5 mm. long, narrowly linear, apex triangularly acute, base extending into short slender tails; filaments linear, flattened, inserted below the middle of the tube; style barely exceeding the corolla, 2 or sometimes 3-cleft; achenes 2 mm. long, mostly curved, reddish brown, sparsely hispid, 5-costate, obscurely compressed on the back; paleaceous pappus unequal, setosely terminated, less than 1 mm. long.

Type specimen 514 collected by *E. D. Merrill* in a dry open grassy valley at Halsey Harbor, Island of Culion, December, 1902. The leaves of the genus *Chrysogonum* are described as being opposite, while those of our specimen are alternate, although in every other respect it apparently agrees with the generic diagnosis.

30. SIEGESBECKIA LINN.

Glandular pubescent herbs, with opposite toothed leaves. Heads heterogamous, in leafy panicles, yellow or white; outer flowers fertile with short tube 2 to 3-segmented; disk flower perfect, fertile or the innermost sterile, tubular and 5-toothed or narrower and 3 to 4-toothed; involucre hemispheric; bracts few, glandular, the outer leaf like and spreading, the inner ones enclosing the outer flowers; receptacle small; anther bases entire; style arms short and flattened; achenes obovoid, often incurved; pappus none.

Species 4; tropical and subtropical regions.

1. **S. orientalis Linn.** Hort. Cliff. 412, 1737. *DC.* Prod. 5; 495, 1836. *Miq.* Fl. Ind. Bat. 2; 67, 1856. *Benth.* Fl. Hongk. 182, 1861: Fl. Austr. 3; 535, 1866. *F. Vil.* Nov. App. 117, 1880. *Hook.* Fl. Brit. Ind. 3; 304, 1881. *Vid.*

Phan. Cuming. Filip. 122, 1885: Rev. Pl. Vasc. Filip. 163, 1886. *Forbes* and *Hemsl.* in Journ. Linn. Soc. Bot. 23; 433, 1888. *Ceron* Cat. Pl. Herb. 102, 1892. *Lautr. u. Schum.* Fl. Deutsch. Schutz. Suds. 599, 1901. *Hayata* in Journ. Coll. Sci. Tokyo 18; Art. 8, 17, 1904. *King* and *Gamb.* Mat. Fl. Malay. Penin. 16; 41, 1905. *Minyranthes heterophylla Turcz.* in Bull. Imp. Nat. Soc. Mosc. 24; 180, 1851.—An erect much branched annual. Leaves short petioled, strigose pubescent on both sides, the lower surface usually paler, triangularly ovate, coarsely toothed or subundulate. Heads solitary, upon subglandular pubescent slender peduncles, either axiliary or terminal; basal spathulate bracts densely covered with stipitate glands, strigose pubescent; short inner bracts truncate, also glandular or only pulverulent; corolla white, subpersistent; achenes 4-angled, rugose.

Distribution:

Generally dispersed over all tropical and subtropical regions.

Luzon:

Baguio, Province of Benguet, March, 1904, *Elmer* 5966.

31. ENHYDRA LOUR.

Glabrous or scaberulous marsh herbs, with opposite sessile leaves. Heads heterogamous, axillary, subsessile, usually in alternate axils; outer flowers pistillate and fertile, 3 to 4-toothed; ligule if present minute; disk flowers perfect, the inner ones often sterile, with tubular limb 5-segmented; involucre of 4 bracts, in two opposite pairs, the outer pair at least foliaceous and larger; receptacle conic; scales enclosing the flowers, glandulary tipped; anthers entire at the base; style arms obtuse, hispid; achenes oblong, the outer dorso-ventrally the inner laterally compressed; pappus none.

Species 6 to 9; all South American and West Indian except one.

1. **E. fluctuans Lour.** Fl. Cochin. 511, 1790. *DC.* Prod. 5; 637, 1836. *F. Vil.* Nov. App. 117, 1880. *Hook.* Fl. Brit. Ind. 3; 304, 1881. *Mart.* in Nuov. Giorn. Bot. Ital. 15; 295, 1883.—Quite glabrous or frequently glandular biennial herbs,

with elongated prostrate stems either simple or divaricately branched and rooting at the nodes. Leaves sessile, linear, oblong but quite variable, obtuse or acute, subcrenate, base either narrowed or truncate. Heads axillary and terminal, sessile or short pedunculate.

Although we have seen no specimens *Villar* reports to have seen living specimens in stagnant water of Luzon and Panay. Since it is native to Sumatra, Malay, China and Cochinchina its occurrence in the Philipines seems very possible.

32. ECLIPTA LINN.

Hirsute annuals, with opposite leaves. Heads heterogamous, axillary or terminal, rayed; ligulate flowers white, rarely yellow, usually fertile; disk flowers perfect, also fertile, tubular, 4 to 5-segmented; involucre broadly campanulate, its herbaceous bracts in 2 series; scales enclosing several flowers, the inner ones narrow or absent; anther bases subentire; style arms flattened, with triangular appendages; ray achenes smaller, apex entire or 2-aristate.

Species 4; South American and one in the Orient.

1. E. alba (Linn.) Hassk. Pl. Jav. Rar. 528, 1848. *Miq.* Fl. Ind. Bat. 2; 65, 1856. *Benth.* Fl. Hongk. 181, 1861: Fl. Austr. 3; 536, 1866. *F. Vil.* Nov. App. 117, 1880. *Naves* in Fl. Filip. ed. 3; t. 284, 1880. *Hook.* Fl. Brit. Ind. 3; 304 1881. *Mart.* in Nuov. Giorn. Bot. Ital. 15; 295, 1883. *Forbes* and *Hemsl.* in Journ. Linn. Soc. Bot. 23; 433, 1888 *Lautr. u. Schum.* Fl. Deutsch. Schutz. Suds. 599, 1901. *Hayata* in Journ. Coll. Sci. Tokyo 18; Art. 8, 17, 1904. *Artemisia viridis Blco.* Fl. Filip. ed. 2; 436, 1845. *Verbesina alba Linn.* Sp. Pl. 902, 1753. *Anthemis cotula Blco.* Fl. Filip. ed. 1; 633, 1837.—An erect, decumbent or sprawling common herb, much branched. Leaves sessile, lanceolate, unequal in size, equally tapering at both ends, subentire; strigose on both surfaces. Heads on slender erect hirsute peduncles, usually shorter than the leaves; outer bracts broad and longer than the linear inner ones, strigose; young achene ciliate at the apex, when mature subcompressed, its edges thick and extending over the apex, its sides corrugated or tubercled.

DISTRIBUTION:

In all tropical and subtropical countries.

LUZON:

Bacolor, Province of Pampanga, May 1904, *Parker* 11.

Manila, October to November 1903, *Merrill* 3484.

Manila, January 1904, *Elmer*, 5521.

Atimonan, Province of Tayabas, August to September 1904, *Whitford* 735.

Gumiaca, Province of Tayabas, September 1904, *Whitford* 901.

Manila, May 1902, *Merrill* 44.

MINDORO:

Calapan, 1903, (collector unknown).

MINDANAO:

Davao, April 1903, *DeVore* and *Hoover* 196.

San Ramon, Province of Zamboanga, February 1904, *Hallier*.

33. BLAINVILLEA CASS.

Scabrous or pubescent herbs. Leaves petioled, toothed, the lower ones opposite, the uppermost alternate. Heads heterogamous, terminal or axillary, subsessile, rather small; marginal flowers pistillate and fertile; ligule if present yellow, small, 2 to 3-toothed; disk flower perfect, tubular limb 5-toothed; involucre subglobose; its bracts few, the otuer herbaceous, the inner rigid and membranous; receptacle small, convex; scales enfolding the flowers; anthers entire and obtuse at the base; style divisions narrow, flattened, acute; achenes truncate, the outer triquetrous, the inner 3 to 4-angled; pappus of 3 to 5 unequal bristles, connate at the base.

Species 9; all tropical and of both hemispheres.

1. B. rhomboidea Cass. Dict. Sci. Nat. 29; 493, 1826. *DC*. Prod. 5; 492, 1836. *B. latifolia DC.* in *Wight* Contrib. 17, 1834. *Walp.* in Nov. Act. Nat. Cur. 19, Suppl. 1; 266,1893.

Hook. Fl. Brit. Ind. 3; 306, 1881. *Ceron* Cat. Pl. Herb. 102, 1892.—A widely dispersed old world species, with rigid stems. Leaves hispid, petioled, the lower opposite, the upper alternate, ovate, 3-nerved, crenately serrate. Heads peduncled; ligules yellowish white; bracts oblong, obtuse and rigid; achenes of the outer flowers triquetrous, somewhat curved.

We are somewhat in doubt as to the identity of *Walper's* specimen cited from Manila. *B. rhomboidea Cass.* is a weed, dispersed throughout the tropics of America, Africa, Asia and Australia, and much resembles the genus *Eclipta*.

34. WEDELIA JACQ.

Herbs or undershrubs, hirsute or scabrous, with opposite leaves. Heads heterogamous, axillary or terminal, yellow; ray flowers pistillate and fertile; disk flowers perfect, fertile or the innermost sterile, tubular and 5-segmented; involucral bracts in 2 series, outer 3 to 5, usually foliaceous, the inner ones dry; receptacle flat or convex; anther bases subentire; style arms of central flowers with acute hairy tips; achenes cuneate to oblong, thick, smooth or tubercled; pappus none, or sometimes with a few short scales or bristles.

Species 50 to 60; tropical and subtropical of both the eastern and western hemispheres.

1. W. biflora DC. in *Wight* Contrib. 18, 1840-56. *Benth.* Fl. Austr. 3; 539,1866: Fl. Hongk. Suppl. 20, 1872. *F. Vil.* Nov. App. 117, 1880, *Hook.* Fl. Brit. Ind. 3; 306, 1881. *Mart.* in Nuov. Giorn. Bot. Ital. 15; 296, 1883. *Ceron* Cat. Pl. Herb. 102, 1892. *Forbes* and *Hemsl.* in Journ. Linn. Soc. Bot. 23; 433, 1888. *Merr.* Govt. Lab. Publ. 27; 55, 1905. *Hayata* in Journ. Coll. Sci. Tokyo 18; Art. 8, 19, 1904. *Wallastonia biflora DC.* Prod. 5; 546, 1836. *Miq.* Fl. Ind Bat. 2; 70, 1856. *Benth.* Fl. Hongk. 183, 1861. *King* and *Gamb.* Mat. Fl. Malay. Penin. 16; 42, 1905. *W. calendulacea Less.* in *F. Vil.* Nov. App. 117, 1880. *Spilanthes peregrina Blco.* Fl. Filip. ed. 1; 622, 1837. *Stemmodontia biflora Linn.* in Contr. Nat. Herb. 9; 337, 1905.—Sprawling or subscandent herbs. Leaves opposite long petioled, ovate, acuminate, dentate, 3 to 5-nerved from near the base, strigose especially on the under surface. Heads upon axillary or terminal, loosely branched pedunculate cymes; outer bracts rather broad strigose, acuminate; flowers all yellow, the ligule variable in length but usually quite showy; scales persistent, exceeding the achenes, striate, strigose above the middle, conduplicate, acute; young achene pubescent at the apex, sometimes bearing few pappus bristles; mature achenes of the outer flowers triquetrous, those of the inner flowers compressed, edges not conspicuous.

DISTRIBUTION:

Along the shores of tropical eastern Asia and of all the Oriental Pacific islands.

PHILIPPINES:

1894-5 *Marave* 172.

LUZON:

Atimonan, Province of Tayabas, August to September 1904, *Whitford* 685.

Mount Mariveles, Province of Bataan, April 1804, *Whitford*.

Atimonan, Province of Tayabas, August 1904, *McGregory* 91.

Mount Mariveles, Province of Bataan, September to December 1904, Forestry Bureau 1953, collected by *Borden*.

Manila, April 1902, *Merrill* 1.

Baguio, Province of Benguet, March to June 1904, *Elmer* 5967 and 6605.

MINDORO:

Baco, January 1903, *Merrill* 1259.

Apo, Mindoro Straits, December 1902, *Merrill* 431.

PANAY:

Tugubanhan, January 1904, *Copeland* 118.

MINDANAO:

Tagalaya, Province of Davao, April 1904, *Copeland* 1325.

Davao, April 1903. *DeVore* and *Hoover* 149.

Masbate:

August 1903, *Merrill* 3048.

35. SPILANTHES LINN.

Annual herbs, with opposite leaves. Heads heterogamous or homogamous, long peduncled, axillary or terminal; ligulate flowers white or yellow, fertile; disk flowers also fertile, tubular, 4 to 5-segmented; involucre ovoid; receptacle convex, elongated, scales enclosing the flowers; anther bases truncate; style arms of perfect flowers truncate; achenes triquetrous, its angles usually ciliate; pappus none, or of few minute bristles.

Species 20 to 30; chiefly tropical American.

Ligules of ray flowers conspicuous.

Leaves lanceolate, obscurely toothed.

1. S. grandiflora.

Leaves triangularly ovate, coarsely dentate.

2. S. ovata.

Ligules minute or obsolete.

3. S. acmella.

1. S. grandiflora (Turcz.) Miq. Fl. Ind. Bat. 2; 1078, 1856. *Benth.* Fl. Austr. 3; 541, 1866. *F. Vil.* Nov. App. 118, 1880. *Vid.* Phan. Cuming. Filip. 122, 1885: Rev. Pl. Vasc. Filip. 163, 1886. *Acmella grandiflora Turcz.* in Bull. Imp. Nat. Soc. Mosc. 24; 185, 1851.—Decumbent, loosely branched and glabrous herbs, 3 to 5 dm. in length. Leaves petioled, lanceolate, obscurely toothed or subentire, acuminate, 1 to 3-nerved. Heads conical, solitary upon long grabrous peduncles, much exceeding the leaves; bracts persistent, lanceolate; ligules yellow, 3-toothed, exceeding the bracts; tubular corolla short, caducous, also yellow; scales scarious, keeled, obtuse, equalling the corolla; achenes much compressed, ciliate on the edges, subemarginate, bearing 2 scabrous bristles.

Distribution:

Australia.

Philippines:

1836-41, *Cuming* 1154.

2. S. ovata Merr. in Philip. Journ. Sci. 1, Suppl. 3; 246, 1906.—An erect or straggling herb. Stems and branches slender, terete, smooth, reddish. Leaves opposite, upon 3 to 5 mm. long strigose petioles, subcoriaceous, triangularly ovate, subglabrous on both sides, shining green above, beneath conspicuously 3-nerved from the base and paler in color, acute, crenately dentate on the margins especially toward the base, the pairs 2 to 4 cm. apart. Heads solitary, upon slender leafless peduncles terminating the stems and branches, larger ones 1.5 cm. high, almost 3 cm. in diameter; involucre 1-seriate, the bracts rather broad, acute, imbricate, 5 mm. long, finely strigose along the margins; receptacle cylindrical or subconical; ligule 1 to 1.5 cm. long, showy, wholly yellow, 4 mm. wide at the truncate apex which is shallowly 3-toothed; disk flowers very numerous, tubular, 3 mm. long, the 5 obtuse teeth also yellow, subtended by 4 mm. long yellowish tipped membranous bracts; immature achenes compressed, 3 mm. long, ciliate along the edges, widest above the middle, with or without 2 fine bristle like awns.

This alpine species is reported rather common in open pine regions at 2,100 meters.

LUZON:

Mount Data, Province of Lepanto, November 1905, *Merrill* 4573.

3. S. acmella Linn. Sp. Syst. Veg. 610, 1774. *DC.* Prod. 5; 623, 1836. *Miq.* Fl. Ind. Bat. 2; 79, 1856. *F. Vil.* Nov. App. 117, 1880. *Vid.* Cat. Pl. Prov. Manila, 34, 1880: Phan. Cuming. Filip. 122, 1885: Rev. Pl. Vasc. Filip. 163, 1886. *Mart.* in Nuov. Giorn. Bot. Ital. 15; 296, 1883. *Ceron* Cat. Pl. Herb. 103, 1892. *Lautr. u. Schum.* Fl. Deutsch. Schutz. Suds. 601, 1901. *Hayata* in Journ. Coll. Sci. Tokyo 18; Art. 8, 20, 1904. *Merr.* Govt. Lab. Publ. 27; 55, 1905. *King* and *Gamb.* Mat. Fl. Malay. Penin. 16; 43, 1905. *S. lobata Blco.* Fl. Filip. ed. 1; 622, 1837.—A much branched erect or ascending glabrous herb. Leaves petioled, membranous, ovate or oblong, glabrous on both sides, coarsely dentate or obscurely undulate, 3-nerved from the base, acute. Heads conical, on erect glabrous peduncles, much exceeding the leaves, solitary, numerously and densely flowered; bracts uniseriate, oblong, obtuse, subglabrous, persistent; ligules very minute or absent, yellow; scales short or stipitate, keeled, truncate, scarious, exceeding the achene; corolla, yellow; achenes compressed, black, ciliate along the edges, subemarginate, bearing two unequal bristles.

DISTRIBUTION:

In warm regions of the old world.

PHILIPPINES:

1894-5, *Marave* 175.

LUZON:

Bayombong, Province of Nueva Viscaya, May 1902, *Merrill* 306.

36. HELIANTHUS LINN.

Erect annual or perennial herbs, with opposite or alternate leaves. Inflorescence large, corymbose; heads heterogamous, solitary, upon long peduncles; involucre hemispheric, the bracts imbricated in several series; receptacle flat, convex or conic, chaffy; ligulate flowers neutral, the rays yellow and subentire; disk flowers perfect, fertile, the corolla tube toothed and sometimes brown or yellow, anthers minutely 2-toothed at the base; style arms tipped with hirsute appendage; achenes thick, compressed, somewhat 4-angled; pappus paleaceous, few or with shorter additional ones, all deciduous.

Species 60; natives of the new world.

1. H. annuus Linn. Sp. Pl. 904, 1753. *DC.* Prod. 5; 585, 1836. *Miq.* Fl. Ind. Bat. 2; 66, 1856. *F. Vil.* Nov. App. 117, 1880.—A stout scabrous or hispid annual, much branched, 1 to 2 m. high or in cultivation much higher. All but the lower leaves alternate, petiolate, ovate, dentate, acute at apex, rough on both sides, the lower ones cordate at base. Heads large, often much compressed; involucre depressed, its bracts oblong, usually long acuminate or aristate, ciliate; scales enclosing the disk flowers, 3-cleft; achenes obovoid, subglabrous when mature; pappus of two palea.

Distribution:

India, Persia and in America.

Luzon:

Manila, November 1902, Normal School students.

37. SYNEDRELLA GAERTN.

Much branched, pubescent or villous annual herbs, with opposite leaves. Heads radiate, heterogamous, terminal or axillary; ligule short but rather broad, yellow, 2 to 3-toothed; disk flowers fertile, tubular, 4-toothed; involucre oblong; bracts few, the outer foliaceous, inner ones chaffy; anther bases subentire; style arms with long acute tips; ray achenes smooth, 2-winged, the wings lacerate; those of the disk compressed or triquetrous, often muricate, the angles terminating into spines.

Species 2; tropical American, African and Asiatic.

1. **S. nodiflora Gaertn.** Fruct. 2, t. 171; 456, 1791. *DC.* Prod. 5; 629, 1836. *Naves* in Fl. Filip. ed. 3; t. 404, 1880. *Hook.* Fl. Brit. Ind. 3; 308, 1881. *Merr.* Govt. Lab. Publ. 6; 25, 1903. *King* and *Gamb.* Mat. Fl. Malay. Penin. 15; 44, 1905.—A common introduced species, usually much branched, from 5 cm. up to 5 dm. high. Leaves subentire or finely serrate, ovate at the base, much contracted and petiole like, sparsely strigose on both sides, usually 3-nerved from near the base. Heads turbinate, sessile or upon short peduncles; outer bracts strigose, exceeding the linear inner ones; ligulate flowers 3 to 5, its tube filiform, bearing a short obovate, entire or toothed yellow ligule; outer achenes broadly compressed, pectinate; inner ones narrower, edges entire bearing 2 rigidly scabrous spinose pappus bristles.

Distribution:

Tropical America, and introduced in the old world.

Philippines:

1894-5, *Marave* 188.

LUZON:

Atimonan, Province of Tayabas, August 1904, *McGregory* 109.

Bacolor, Province of Pampanga, June 1904, *Parker* 74.
Manila, May 1902, *Merrill* 36.

Surigao, Province of Tayabas, August 1904, *Whitford* 542.
Manila, January 1904, *Elmer* 5505.

Bauang, Province of Union, February 1904, *Elmer* 5719.

38. COREOPSIS LINN.

Annual or perennial herbs, with leaves various. Heads terminating the peduncle like branches; central flowers tubular, outer and neutral ones rayed; ligules particolored, yellow or rarely pink; involucre campanulate, their bracts in two series, more or less united at the base; the outer series usually narrow and herbaceous, the inner broader and thin; scales scarious; anther bases entire; style tips truncate or subulate; achenes flat, oblong, angled or winged; pappus none, or of few short teeth.

Species about 70; chiefly American, some in Africa, Australia and on the Sandwitch Islands.

1. C. drummondii T. and **G.** Fl. North Am. 2; 435, 1840. *Small* Fl. South. U. S. 1277, 1903.—A branched and glabrous introduced species. Leaves petioled, laciniately dissected, glabrous, sharply pointed. Heads upon slender glabrous peduncles; bracts glabrous, in two series, nearly equal in length; outer ones nerved, slenderly acuminate; inner ones broader, slightly colored, nerveless; flowers all yellow; the ligulate ones neu- tral; scales linear, membranous; achenes smooth, without bristles; the outer ones fusiform, fluted and obscurely angled; the central ones more or less compressed, beaked.

Villar Nov. App. 118, 1880, cites "*C. elegans Linn.*" of which we are unable to find any published record. From one of the synonyms in his list *C. tinctoria Nutt.* our species is chiefly distinguished by its involucre. Probably it should be referred under *C. gracilis Blco.* Fl. Filip. ed. 2; 591, 1845. *Merrill* Govt. Lab. Publ. 6; 25, 1904 considers it *Cosmos sulphureus Cav.*, but our specimens are without the retrorsely scabrous pappus bristles.

DISTRIBUTION:

Southwestern United States.

LUZON:

Pasacao, Province of Camarines, November 1903, *Merrill* 3367.

LEYTE;

Polo, January 1906, *Elmer* 7039.

39. DAHLIA CAV.

Nonaromatic perennial herbs, with opposite 1 to 3 pinnately dissected leaves and nodulose roots. Heads heterogamous; the outer flowers ligulate, the inner ones tubular and 5-toothed; involucre 2-seriate; exterior bracts foliaceous, inner ones membranous and united at the base; receptacle plane, bearing thin oblong scales; style arms erect or recurved; anthers eucaudate or appendiculate; achenes oblong, without pappus.

Species 9; mostly Mexican.

1. D. coccinea Cav. Ic. 3; 33, t. 266, 1794. *DC*. Prod. 5; 494, 1836. *F. Vil*. Nov. App. 118, 1880. *D. cervantesii Lag*. in *F. Vil*. Nov. App. 118, 1880. *D. variabilis Desf*. in *F. Vil*. Nov. App. 118, 1880.—Profusely and delicately branched pot herbs with glaucous stems. Leaves opposite, petioled, 2 to 3-pinnate, subglaucous, its lobes ovate to lanceolate, dentate. Heads solitary, showy; outer series of bracts herbaceous, becoming reflexed, inner ones broader and exceeding the outer series; ligulate flowers neutral, usually purple.

Although we have no reference specimens on hand, it is known that *Dahlias* have been introduced from Mexico and are grown here as pot plants for their beauty. None of them seem to have been reported from the other Oriental countries.

40. BIDENS LINN.

Annual or perennial herbs, with opposite serrately lobed or dissected leaves. Heterogamous heads, quite large, with ligules showy or rudimentary; involucre hemispheric, its bracts in 2 series and almost distinct; ray flowers when present neutral, yellow; disk flowers perfect, fertile, with tubular 5-segmented corollas; anthers entire or minutely sagittate; style arms either short or subulate; achenes flat, quadrangular, or nearly terete, cuneate, oblong or linear; pappus of 2 to 6 teeth or awns, antrorsely or retrorsely barbed.

Species about 90; chiefly American.

1. B. pilosa Linn. Sp. Pl. ed. 2; 832, 1762-3. *DC.* Prod. 5; 597, 1836. *Miq.* Fl. Ind. Bat, 2; 76, 1856. *Benth.* Fl. Hongk. 183, 1861: Fl. Austr. 3; 543, 1866. *F. Vil.* Nov. App. 118, 1880. *Mart.* in Nuov. Giorn. Bot. Ital. 15; 297, 1883. *Vid.* Phan. Cuming. Filip. 122, 1885: Rev. Pl. Vasc. Filip. 163, 1886. *Forbes* and *Hemsl.* in Journ. Linn. Soc. Bot. 23; 435, 1888. *Ceron* Cat. Pl. Herb. 103, 1892. *Lautr. u. Schum.* Fl. Deutsch. Schutz. Suds. 601, 1901. *Hayata* in Journ. Coll. Sci. Tokyo 18; Art. 8, 20, 1904. *King* and *Gamb.* Mat. Fl. Malay. Penin. 16; 45, 1905. *Merr.* Govt. Lab. Publ. 27; 56, 1905. *B. bipinnata Blco.* Fl. Filip. ed. 1; 623, 1837.—A common introduced weed, much branched, 3 to 5 dm. high. Leaves trifoliate or 1 to 2-pinnatifid, petioled, glabrous or pilose, membranous, its segments ovate or lanceolate to oblong and serrately toothed. Heads solitary, upon rigid peduncles; outer bracts linear, strigose, shorter than the broad scariously margined inner ones; scales thin, hyaline margined, finely striate; ligule in our specimen rudimentary or absent; achenes glaucously black, costate and subterete, bearing 3 to 4 unequal retrosely barked awns.

DISTRIBUTION:

Widely dispersed in all tropical and subtropical regions of both worlds.

LUZON:

Caloocan, Province of Rizal, November 1901, *Merrill* 3647.
Baguio, Province of Benguet, March 1904, *Elmer* 5769.

MINDORO:

Puerta Galera, October 1903, *Merrill* 3335.

MINDANAO:

Santa Cruz, Province of Davao, April 1903, *DeVore* and *Hoover* 260.

San Ramon, Province of Zamboanga, February 1904, *Hallier*.

41. GLOSSOGYNE CASS.

Glabrous perennial herbs, with mostly pinnatifid radical leaves. Heads few, corymbose, heterogamous and rayed or homogamous and discoid; ligules yellow, rarely white; disk flowers tubular, perfect, limb, 5-toothed, involucre small, its bracts narrow and connate at the base; bases of anthers obtuse; style arms of perfect flowers with long hairy tips; achenes compressed, linear, glabrous, truncate.

Species 5; in Australia and tropical Asia.

1. **G. tenuifolia Cass.** Dict. Sci. Nat. 51; 475, 1826-34. *DC.* Prod. 5; 632, 1836. *Miq.* Fl. Ind. Bat. 2; 83, 1856. *Benth.* Fl. Hongk. 184, 1861: Fl. Austr. 3; 544, 1866. *F. Vil.* Nov. App. 119, 1880. *Vid.* Phan. Cuming. Filip. 122, 1885: Rev. Pl. Vasc. Filip. 163, 1886. *Forbes* and *Hemsl.* in Journ. Linn. Soc. Bot. 23; 436, 1888. *Lautr. u. Schum.* Fl. Deutsch. Schutz. Suds. 602, 1901. *Hayata* in Journ. Coll. Sci. Tokyo 18; Art. 8, 22, 1904. *G. tridentata (Turcz.) F. Vil.* Nov. App. 119, 1880. *Bidens tridentata Turcz.* in Bull. Imp. Nat. Soc. Mosc. 183, 1851. *B. denudata Turcz.* l. c. *B. tripartita Linn.* (*Loher* 3637).—Herbs from a thick biennial root. Stems glabrous, terete, several from the root. Leaves chiefly radical, glabrous, long petioled, with 2 to 3 pairs of pinnate lobes, the terminal lobe usually somewhat larger. Heads solitary, upon slender peduncles; bracts striate, linear, obtuse, uniseriate, connate at the base, shorter than the flowers, glabrous and somewhat fleshy; ligules of ray flowers spreading, yellow, rather short, toothed; scales narrowly linear; central corollas also yellow; achenes much compressed, glabrous, striate, elongated, bearing 2 hooked spinose pappus bristles.

DISTRIBUTION:

Australia, China and Japan.

LUZON:

Bagabag, Province of Nueva Viscaya, June 1902, *Merrill* 158.

42. COSMOS CAV.

Annual or perennial caulescent herbs, with opposite entire, lobed or dissected leaves. Heterogamous heads peduncled; involucre nearly hemispheric; bracts in 2 series, thin, united at the base; receptacle usually flat; ray flowers neutral, its ligule pink, purple or rarely yellowish; disk flowers perfect, fertile; anther bases entire or minutely 2-toothed; style arms of perfect flowers slender, often tufted; achenes 5-angled or flattened on the back, beaked; pappus of 2 to 4 barbed awns.

Species 15 to 20; chiefly in tropical America.

1. C. caudatus H. B. K. Nov. Gen. et Sp. 4; 240, 1820. *DC*. Prod. 5; 606, 1836. *F. Vil*. Nov. App. 118, 1880. *Naves* in Fl. Filip. ed. 3; t. 287, 1880. *Mart*. in Nuov. Giorn. Bot. Ital. 15; 297, 1883. *Merr*. Govt. Lab. Publ. 6; 25, 1904.—A glabrous introduced species. Leaves petioled, pinnately dissected, glabrous, segments acuminately lanceolate, terminating into fine points. Heads upon erect, rather rigid peduncles and much exceeding the leaves; outer bracts foliaceous, slender, sharply pointed; inner ones shorter, glabrous, linear lanceolate, scabrous along the edges; ligules showy, purple, thin and prominently nerved, entire or semilobed; scales linear, obtuse; disk flowers yellow; achenes slender, straight or curved, base attenuate, terminating into slender antrosely scabrous beaks; awns 2, extrorsely scabrous, with a short paleaceous one between.

DISTRIBUTION:

Introduced from Mexico.

PHILIPPINES:

1894-5 *Marave* 178.

LUZON:

Dinalupihan, Province of Bataan, January to February 1903, *Merrill* 1562.

Antipolo, Province of Rizal, February 1903, *Merrill* 1346.

Caloocan, Province of Rizal, November 1903, *Merrill* 3646.

Bosoboso, Province of Rizal, September 1904, Forestry Bureau 1859.

Atimonan, Province of Tayabas, August 1904, *McGregory* 59.

LEYTE:

Polo, January 1906, *Elmer* 7037.

MINDANAO:

Santa Cruz, Province of Davao, April 1903, *DeVore* and *Hoover* 234.

IX. CYNAREAE.

Leaves alternate, often spinose. Flowers all tubular. Involucral bracts many seriate, imbricate; tips scarious, spinose or foliaceous. Receptacle densely bristly or palaceous, rarely pitted. Corolla limb slender, deeply 5-fid. Anther cells tailed. Styles subentire, or arms short hairy or thickened towards the base. Achenes often hard. Pappus various, rarely none.

Pappus bristles plumose.

54. CIRSIUM.

Pappus usually paleaceous or none.

55. CARTHAMUS.

54. CIRSIUM SCOP.

Erect herbs, with alternate often decurrent toothed or spinescent leaves. Heads homogamous, solitary upon long peduncles or clustered and subsessile, discoid; tubular flowers 5-cleft, purple, yellow or white, perfect and fertile, rarely dioecious; involucre ovoid or globose, its bracts imbricated in many series, unarmed and prickly tipped; receptacle flat or convex, bristly; anthers sagittate at the base; filaments pilose or rarely glabrous; style arms short or elongated, obtuse; achenes smooth or ribbed, compressed or angled, obovate or oblong; pappus of several series, plumose, minutely serrulate, connate at the base.

Species 120; chiefly confined to the northern hemisphere.

1. C. wallichii DC. Prod. 6; 643, 1837. *Cnicus wallichii (DC.) Hook.* Fl. Brit. Ind. 3; 363, 1881. *Rolfe* in Journ. Bot. 23; 214, 1885. *Vid.* Rev. Pl. Vasc. Filip. 164, 1886. *Ceron* Cat. Pl. Herb. 104, 1892.—Erect, biennial, solitary or with several stems from the base, 4 to 6 dm. high. Leaves lanceolate in outline, sinuately dissected, its lobes sharply spinescent, subglabrous above, woolly pubescent beneath, auriculate and clasping at base. Heads more or less crowded, upon bracteate peduncles, erect; bracts glabrous, dilated, acuminate, terminating into a fine point; flowers dull white, thin and slender below the middle, the upper portion dilated; style entire, exceeding the stamens; achenes slightly compressed, smooth and glabrous; pappus easily detached, dirty white, plumose except at the scabrous thickened tips.

Our specimen was collected in open lands of the pine region along dry grassy ridges at an altitude of 2,000 meters. *C. wallichii DC.* was discovered in the cordilleras of the Nilgherry and Himalaya and may prove to be specifically distinct from our species.

LUZON:

Mount Santo Tomas, Province of Benguet, May 1904, *Elmer* 6272.

55. CARTHAMUS LINN.

Thistle like herbs, with alternate rigid leaves. Heads usually homogamous; flowers all fertile, rarely pistillate or neuter, purplish or yellowish white; limb of perfect flowers dilated at base, 5-cleft; involucre ovoid, its bracts in many series, the outer foliaceous and toothed or spinescent, the inner dry and usually entire; receptacles flat, densely bristly; filaments usually hairy in the middle; anthers sagittate; auricles connate, tails short fimbriate; style arms long or short; achenes glabrous, obovoid, angled, with or without paleaceous pappus.

Species about 20; mostly in the Mediterranean region.

1. C. tinctorius Linn. Sp. Pl. 830, 1753. *DC.* Prod. ‘9 612, 1837. *Blco.* Fl. Filip. ed. 1; 616, 1837: ed. 2; 431, 1845. *Miq.* Fl. Ind. Bat. 2; 106, 1856. *Benth.* Fl. Austr. 3; 458, 1866. *F. Vil.* Nov. App. 120, 1880. *Hook.* Fl. Brit. Ind. 3; 386, 1881. *Ceron* Cat. Pl. Herb. 104, 1892.—Rigid herbs, chiefly branched above the middle; stem and branches shining smooth and whitish. Leaves sessile, chartaceous, glabrous, entire or spinulose serrate, ovate, conspicuously nerved on both sides. Heads upon leaf bracteate peduncles, solitary; basal portion of the lower bracts chartaceously constricted and entire; the upper portion usually spreading and leaf like, entire or remotely spinescent; flowers orange red; achenes obovoid, 4-angled bearing 4 bosses; pappus none.

This species is widely distributed throughout the warm countries of the old world, and is sometimes cultivated for the coloring matter. *Villar* reports to have seen living specimens in Panay and Luzon, and we have no reasons to doubt his observation.

X. MUTISIEAE.

Leaves rarely opposite. Heads heterogamous or homogamous, rayed or not; involucral bracts many seriate, unarmed; receptacle rarely paleaceous; corolla 2-lipped, ligulate or deeply 5-fid; anther cells usually tailed; style arms rounded. or truncate, not appendaged, pappus various.

56. AINSLIAEA DC.

Erect scapigerous perennial herbs, with simple or branched scapes. Leaves mostly basal, the upper ones alternate. Inflorescence upon a slender flowering stem, either fascicled, spicate, racemose or paniculate; heads homogamous, small, sessile or pedunculate, often pendulous; flowers discoid, white or purplish 1 to 4 to each head, all perfect and fertile, its limb unequally 5-segmented; involucre narrow; bracts many seriate, loosely imbricate, rigid; anther bases sagittate; tails long and bearded; style arms narowly cuneate, tips spreading, rounded; achenes oblanceolate, subcompressed, ribs none or 5 to 10, hairy; pappus bristles 1-seriate, feathery.

Species 16; Japan, China and India.

1. A. reflexa Merr. in Philip. Journ. Sci. 1, Suppl. 3; 242, 1906.—Small tufted annual or biennial. Stems scapiform, erect, slender, terete, brown pubescent when young, 2 to 5 cm. high, unbranched. The petiole of the radical leaves 1 to 6 cm. long, with a strong midvein and membranous sides which increase in width toward the blade proper, glabrous above, olivaceous pubescent beneath; blade ovate to lanceolate, thin, acute, the ovate ones rounded at the base, the lanceolate acute or cuneate, with 3 pairs of nerves, paler and yellowish pubescent beneath, margins subentire but distantly set with slender minute teeth. Inflorescence loosely spicate along the upper half of the scape; heads reflexed, 1 to 3-clustered, sessile or subsessile, subtended by small foliaceous bracts, those in anthesis 1 cm. long; involucral bracts very unequal, numerous, apex sharply acuminate and reddish tipped, the outer ones short and with broad bases, the inner linear and with involute edges, glabrous or often finely pubescent; flowers 3 to 5 in each head; achene 4 mm. long, 1 mm. wide toward the apex, compressed, striate and light brown pubescent on the outer side, less pubescent on the inner one; pappus equal, persistent, 7 mm. long, plumosely hairy nearly to the base.

This species is said to be common in the rain forests at 2,350 meters.

PHILIPPINES:

Loher 3620 and 3621.

LUZON:

Mount Data, Province of Lepanto, November 1905, *Merrill* 4511.

Mount Santo Tomas, Province of Benguet, October to November 1905, *Merrill* 4824.

XI. CICHORIEAE.

Herbs with milky juice. Leaves radical or alternate never opposite. Heads homogamous. Corollas all ligulate; ligule truncate, apex 5-toothed. Anther bases sagittate, rarely tailed. Style arms slender.

Pappus of a few series of short, blunt scales.

57. CICHORIUM.

Pappus bristle like.

Achenes cylindric or contracted at both ends, beakless.

58. LACTUCA.

Achenes flattened.

Achenes narrowed at the summit or beaked.

59. CREPIS.

Achenes truncate, not beaked.

60. SONCHUS.

57. CICHORIUM LINN.

Branching perennial herbs, with basal and alternating leaves, those on the stem and branches usually very small and bract like. Heads homogamous, pedunculate or in sessile clusters along the branches; involucre in two series, the basal somewhat spreading, the inner erect and partly enclosing the achenes; flowers all ligulate, blue, purple or white; receptacle flattened, glabrous or fibrillose; bases of anthers sagittate; style arms slender, obtusish; achenes 5-angled, truncate; pappus of 2 or 3 series of short blunt scales.

Species 8; mostly natives of the Mediterranean region.

1. C. intybus Linn. Sp. Pl. 813, 1753. *DC.* Prod. 7; 84, 1839. *Benth.* Fl. Austr. 3; 680, 1866. *F. Vil.* Nov. App. 120, 1880. *Hook.* Fl. Brit. Ind. 3; 391, 1881. *C. endivia Willd.* in *F. Vil.* Nov. App. 120, 1880.—Perennial, from a fleshy tapering root. Stems mostly glabrous, grooved, with rigid spreading branches. Basal leaves spreading on the ground, runcinately pinnatifid; the cauline ones oblong, cordately clasping, subentire or toothed. Heads thickened about the middle, short pedunculate or in small subsessile clusters, numerously flowered; bracts herbaceous; ligules bright blue 5-toothed, rarely white or pink; achenes angled, mottled; pappus very short.

Villar reports to have seen this widely distributed plant cultivated in some of the Manila gardens. Its roots are often used as a part substitute for coffee.

DISTRIBUTION:

United States, Australia, southern Asia and especially abundant in the Mediterranean region.

58. LACTUCA LINN.

Tall, much branched leafy herbs, with alternate leaves and milky juice. Heads homogamous, rather small, forming large panicles; involucre cylindric, its bracts imbricated in several series; receptacle naked, flat; flowers all ligulate, truncate and 5-toothed, yellow, white or blue; anthers sagittate at the base; style divisions usually slender; achenes oval or linear, flat, 3 to 5-costate on each face, narrowed above or contracted into a slender beak terminated by a small disk; pappus bristles very numerous, soft, white or brownish.

Species about 90; mostly in the old world, comparatively few in North America. The leaves of many species are used in salads, especially those of the great number of improved varieties.

Achenes black, winged.

1. L. brevirostris.

Achenes brown, ribbed.

Leaf edges and nerves beneath spinulose.

2. L. scariola.

Leaf edges and nerves beneath without spines.

3. L. thunbergiana.

1. L. brevirostris Champ. in Kew. Journ. 4; 237, 1849-57, *Benth.* Fl. Hongk. 192, 1861. *F. Vil.* Nov. App. 120, 1880. *Hook.* Fl. Brit. Ind. 3; 405, 1881. *Vid.* Phan. Cuming. Filip. 122. 1885: Rev. Pl. Vasc. Filip. 165, 1886. *Hayata* in Journ. Coll. Sci. Tokyo 18; Art. 8, 38, 1904.—A glabrous annual, with tall paniculately branched stems. Leaves very long, linear or linear lanceolate, sessile, entire or only scabrous along the edges, the base often expanded and margins apiculate. Panicle large, the solitary head upon an elongated bracteate peduncle; bracts glabrous, obtuse; flowers all ligulate, yellow or becoming purplish; achene much flattened, oblong, coal black when mature, conspicuously 1-nerved on each side, the edges winged, roughened transversely; base of the beak black, upper portion dull white, bearing a cupular rim; pappus deciduous, capillary, white.

Distribution:

Manchuria and Japan.

Luzon:

Los Baños, Province of Laguna, December 1903, *Hallier*.

2. **L. scariola Linn.** Sp. Pl. ed. 2; 1119, 1763. *DC.* Prod. 7; 137, 1839. *F. Vil.* Nov. App. 120, 1880. *Hook.* ,Fl. Brit. Ind. 3; 404, 1881.—A biennial, green and glaucous. Stem glabrous, stiff, leafy, widely branched. Leaves oblong or lanceolate, spinulose margined, denticulate or pinnatifid, sessile and auriculately clasping, thin, main nerves spinulose especially beneath. Heads upon whitish peduncles which are numerously set with cordate bracts; involucral bracts ovate, inner ones linear; flowers all ligulate, yellow or dull red on the outside; achenes pale or brownish, ribbed, bearing a very slender beak; pappus whitish.

Of this *Villar* reports to have seen living plants in Luzon and Panay which is probably correct.

Distribution:

Widely distributed over temperate and subtropical regions.

3. **L. thunbergiana (Gray) Maxime.** in Bull. Acad. Petersb. 19; 530, 1874. *Hayata* in Journ. Coll. Sci. Tokyo 18; Art. 8, 39, 1904. *L. luzonica Vid.* Rev. Pl. Vasc. Filip. 165,1886. *Ixeris thunbergiana Gray* Bot. Jap. in Mem. Amer. Acad. 6; 397, 1852-54.—A biennial or perennial herb, with one or several glabrous stems from the root. Leaves mostly radical, subcoriaceous, undulately entire or obscurely lobed, margins remotely apiculate, lanceolate, long petiolate, at the base only obtuse or acuminate, glabrous on both sides, light colored beneath. Inflorescence much branched, forming corymbose panicles; heads narrowly cylindric, upon slender ebracteolate peduncles; bracts all glabrous, in two series, the basal ones very short and narrow; flowers about 9, all ligulate, yellow; achenes brown, linear, little compressed, ribbed, base truncate, transverse mark-

ings faint, terminating into slender beaks; pappus spreading, light brown, persistent upon the small disk.

DISTRIBUTION:

Japan.

LUZON:

Twin Peaks, Province of Benguet, May 1904, *Elmer* 6387.

Bagabag, Province of Nuevo Viscaya, June 1902, *Merrill* 150.

MINDANAO:

Sibulan River, Province of Davao, April 1904, *Copeland* 1312.

59. CREPIS LINN.

Annual or perennial herbs, glabrous or hairy. Leaves radical or alternate, mostly toothed or pinnatifid. Heads homogamous, usually loosely paniculate or corymbose, yellow or orange colored; involucre cylindric, often swollen at the base, its bracts in one series with a few basal ones; receptacle nearly flat, naked or short fibrillose; ligules truncate and 5-toothed; anther bases sagittate; style branches slender; achenes linear oblong, 10 to 20-nerved, attenuate at the base and apex, without proper beaks; pappus dense, of soft white hair.

Species 170; chiefly in the northern hemisphere of the old world.

1. C. japonica (DC.) Benth. Fl. Hongk. 194, 1861: Fl. Austr. 3; 679, 1866. *Vid.* Phan. Cuming. Filip. 122, 1885. *Hook.* Fl. Brit. Ind. 3;395, 1881. *Rolfe* in Journ. Bot. 23; 213, 1885. *Vid.* Rev. Pl. Vasc. Filip. 164, 1886. *Lautr. u. Schum.* Fl. Deutsch. Schutz. Suds. 603, 1901. *Hayata* in Journ. Coll. Sci. Tokyo 18; Art. 8, 36, 1904. *King* and *Gamb.* Mat. Fl. Malay. Penin. 16; 48, 1905. *Youngia japonica DC.* Prod. 7; 194, 1839.—Delicate acaulescent herbs. Basal leaves thin, subglabrous on both sides, petioled, linear, obovate in outline, the terminal lobe oblong, obscurely lobed or incised along the petiole, entire or minutely apiculate. Heads small, upon peduncles forming a sparse panicle; bracts 7 to 9, glabrous, scarious, slightly united at the base, subtended by a few broad basal ones; flowers about 14, ligulate and fertile; achene dark red, somewhat compressed not transversely rugose, scabrous along the nerves, only slightly narrowed at both ends, apex with a small hyaline rim; pappus of fine hairs, easily detached.

Distribution:

Japan, Australia and India.

Luzon:

Mount Arayat, Province of Pampanga, October 1904, *Merrill* 3922.

Todaya, Province of Davao, October 1904, *Copeland* 10.

60. SONCHUS LINN.

Herbs, either annual or perennial, succulent with milky juice. Leaves mostly radical, dentately lobed and prickly margined, the cauline ones auricled and clasping. Heads homogamous, yellow, pedunculate, in corymbs or panicles; involucre ovoid, bracts imbricate in several series; receptacle flat, naked; ligules truncate, 5-toothed; anther bases sagittate; style branches slender; achene oblong, more or less flattened, 10 to 20-ribbed, attenuate at the base, apex truncate; pappus of numerous soft white capillary bristles.

Species 40 to 45; indigenous to the old world.

1. **S. oleraceus Linn.** Sp. Pl. 794;1753. *Miq.* Fl. Ind. Bat. 2; 112, 1856. *Benth.* Fl. Hongk. 194,1861: Fl. Austr. 3; 679,1866. *Hook.* Fl. Brit. Ind. 3; 414,1881. *Hayata* in Journ. Coll. Sci. Tokyo 18; Art. 8,41,1904.—Biennial, with one or more glaucous and glandular stems from the root. Leaves glabrous on both sides, bordered by irregular prickly teeth, either undivided or pinnatifid, lobes usually recurved and the terminal one triangular, the lower ones with winged petioles, the cauline ones sessile and clasping, all with laciniately toothed stipules. Heads medium sized, upon stout peduncles, forming an irregular corymbose panicle; bracts glabrous, except the united base which is

usually covered with cottony hairs, acuminate, unequal, scariously margined; flowers yellow, all ligulate, the tube pubescent at the middle; anthers light brown, compressed, more or less attenuate at the base, glabrous, the ribs marked with transverse asperities; pappus dense, silky white, subpersistent.

Distribution:

Widely dispersed over temperate and subtropical regions.

Luzon:

Los Baños, Province of Laguna, April 1905, *Elmer* 7037^a.

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LEAFLETS
OF
PHILIPPINE BOTANY

A FASCICLE OF EAST LEYTE FIGS

BY

A. D. E. ELMER

SUBSCRIPTION PRICE 2 CENTS PER PAGE.

MANILA, P. I.

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LEAFLETS OF PHILIPPINE BOTANY

EDITED BY A. D. E. ELMER, A. M.

Vol. I. Manila, P. I., December 10, 1906. Art. 8.

A FASCICLE OF EAST LEYTE FIGS

BY

A. D. E. ELMER.

—o—

I. PALAEOMORPHE.

Male flowers with 1 stamen and a rudimentary pistil occupying the same receptacles as the gall flowers; fertile female flowers alone in another set of receptacles; perianth of fertile females usually gamophyllous, 4 to 5-cleft, rarely of separate pieces; small trees, erect or subscandent shrubs.

1. F. pisifera Wall. Cat. 4504, 1828.—A small tree like shrub, 4 m. high; branches widely spreading, with a peculiar yellowish smooth bark; the subglobose figs are subsessile or only very short pedunculate, about the size of a cranberry, yellowish red when mature, in small clusters in the axils of the fallen leaves.

Here in the Philippines it has been confused with *F. celebica Miq.* from which it differs externally in its less pubescent, not acuminate and more coriaceous leaves. The writer collected it several times in different provinces and always found it in the woods along water courses especially on cliffs or upon shelving rocks. Specimen 7372, *A. D. E. Elmer*, Palo, Province of Leyte, Leyte, January, 1906.

2. F. confusa Elm. Leaf. Philip. Bot. 1; 47, 1906.—A tough and numerously branched shrub, straggling or often subscandent in habit. Leaves coriaceous and equally shining on both sides. Figs many, either in the axils of leaves or strung along the branches, globose, smooth, glossy, hard, yellowish but turning red when exposed to the sun.

Common in shrubby jungles along water courses of the woods in the hills at 200 meters. Possibly it is nearest allied to some forms of *F. gibbosa Blm.*, but the Philippine form apparently has constant floral differences by which it can be distinguished from the Indo-Malayan forms. Specimen 7173, *A. D. E. Elmer*, Palo, Province of Leyte, Leyte, January, 1906.

3. F. mindanaensis Warb. in Frag. Fl. Philip. 3; 195, 1905.—Often tree like in shape but usually a 5 m. high widely spreading shrub; wood tough and quite solid; older bark smooth, yellowish white, that on the young parts short brown pubescent. Leaves scattered along the slender half drooping twigs, always descending like the leaves of *Theobroma cacao Linn.*, chartaceous, shining and dark green above, paler and soft pubescent beneath, apex abruptly acuminate, base acute or obtuse, oblong to elliptic oblong, variable in size, the average ones 2 dm. long, 1 dm. wide, with entire margins, frequently a little one sided; nerves beneath very prominent, the 7 to 9 primary lateral pairs ascending, united at their ends; petiole 1 cm. long, stout, short brown pubescent; bud scales 7 mm. long, acuminate, pubescent. Receptacles subpersistent, solitary or in pairs, in leaf axils or more commonly in the axils of the leaf scars, globose, 2 cm. in diameter, its base abruptly tapering into a 12 mm. long peduncle or receptacle stalk which is pubescent and has the receptacle color when mature (an indication that it is a part of the true syconium), near the base subtended by 3 to 5 small bracts, scabrous and a trifle sticky, dark red, hard, subpendulous, at the apex rugged and rim like.

This species is very common at sea level along trails and roads, in fence hedges and in copses. Young figs are pale white, erect, more or less angular. Its spreading habit coupled with the shining green descending leaves and the numerous subpendulous richly colored mature receptacles should make it worthy of cultivation as an ornamental shrub. Specimen 7184 with mature figs and 7183 with young figs, *A. D. E. Elmer*, Palo, Province of Leyte, Leyte, January, 1906.

II. UROSTIGMA.

Male, fertile female and gall flowers in the same receptacle; stamen 1, rarely 2; stigma elongate, usually acute; receptacles in the axils of the leaves or of the scars of fallen leaves, usually tribracteate at the base, leaves alternate, entire, coriaceous or subcoriaceous, rarely membranous; usually trees or powerful climbers; epiphytal at least in the early life.

4. F. forstenii Miq. Ann. Mus. Lugd. Bat. 3; 214, 1865-6.—Possibly subscandent when young but when mature a horizontally spreading tree with trunk 3 to 5 m. high, 2 to 3 m. thick; the main branches probably 25 m. long; bark smooth; ultimate branches thick. Leaves rigid, easily separating from the branches, oblong to ovate elliptic, very unequal in size, glabrous, those of medium size 15 cm. long including the petiole and 7 cm. wide, entire or obscurely undulate, apex obtuse or rounded with a short blunt cuspidate point, base rounded; veins straw color, smooth, very prominent beneath, lateral pairs about 9 to 11 and united at their ends; petiole glabrous, 2 cm. long; bud scales coriaceous, brown, with a few ferruginous hairs on the outer side, triangularly ovate. Receptacle oblong ellipsoid or cylindric, 18 mm. long, 12 mm. in diameter, equally rounded at both ends, umbilicus raised but rather small, shining smooth, sessile, subtended by 3 small ovate bracts, bright lemon color when mature upon the tree, purpureous at the time of falling, soft and wine colored just prior to decay.

It was noticed that different birds sought eagerly the fruits for their food. This, the only tree found, is admirably situated where most of the river flying birds have access and the different shades of color probably serve to attract different animals. Thus the seeds of this tree are acattered by water but principally by birds. This specimen is nearly typical of those from the Celebes. Specimen 7168, *A. D. E. Elmer*, overhanging the rapids of the Bangon River 2 miles above Palo, Province of Leyte, Leyte, January, 1906.

III. SYNOECIA.

Flowers unisexual or neuter; male flowers with 1 stamen; male and gall flowers in one set of receptacles, fertile female and neuter flowers in another set, or the latter absent; climbers with large colored receptacles, the leaves tasselate beneath.

5. F. johnsoni n. sp.—A sprawling numerously branched shrub or subscandent in habit; wood rather wiry; bark yellowish gray, more or less verrucose, the young bark shining smooth and pale yellow. Leaves scattered along the branchlets, shining green above, less so beneath, coriaceous, turning reddish brown when cured, 1 dm. long including the petiole and 4 cm. wide across the middle, but quite variable in size, apex acuminate, base obtuse or rounded, oblong to narrowly elliptic or frequently obscurely ovate to obovate, above glabrous, sparsely strigose beneath, margins entire; veins prominent beneath, subglabrous and reddish, the primary 5 to 7 pairs ascending and united at their apices; petiole 1 to 2 cm. long, wholly glabrous, yellowish brown; bud scales sharply acuminate, 12 mm. long, olivaceous pubescent.

Receptacle 1 or 2 from leaf axils, pendulous upon stout 2 to 3 cm. long glabrous penduncles, smooth surface dull yellow when mature, ovoid or obscurely elliptic, 3 to 4 cm. long by 2.5 cm. in diameter below the middle, its base abruptly constricted into a short stalk and subtended by 3 rather thin and nearly glabrous acute bracts, its apex hard and conically tapering, the umbilicus surmounted by 3 closely set very thickly rounded scales which are nearly black and extremely hard; synconium rather thick and fleshy, with stamens and gall flowers; stamens in a few seriate circles below the umbilical scales, monandrous, subtended by 2 to 3 linear lanceolate 2.5 mm. long subequal bracts; pedicel 4 mm. long, usually curved, united to the perianth which at the apex is broadly bilobed; these glabrous lobes tightly surround the anther before anthesis; the true filament less than 0.5 mm. long, brown, tumid; anther broadly elliptic, much curved ventrally, 1.5 mm. long, dark brown on the back; gall flowers subtended by similar bracts, upon 1.5 mm. long yellowish pedicels; perianth smooth, gamophyllous, in the mature state 4-segmented, slightly shorter than the flower; ovary smooth, dark brown, ellipsoid, 2.5 mm. long, 1 mm. in diameter, apex submarginally notched or emarginate; style of young ovaries glabrous, very slender and thread like, 5 mm. long including the subcompressed linear stigma; the maturer style terminal, strongly recurved and twisted upon itself and down over the ovary, terminating into a fine point.

Type spemimen 7180, *A. D. E. Elmer*, Palo, Province of Leyte, Leyte, January, 1906. Of this rare species the writer discovered only one plant overhanging cliffs near a stream in the woods at 250 meters. Named for *Mr. M. H. Johnson*, a teacher in Leyte.

IV. SYCIDIUM.

Flowers unisexual; male and gall flowers in one distinct set of receptacles; fertile female flowers in a distinct set of receptacles; male flower with 1 stamen, though sometimes with 2. Leaves alternate; receptacles small, axillary, more or less scabrous, a few have receptacles in fascicles from the stem; shrubs, small trees or climbers; rarely epiphytal.

6. **F. benguetense Merr.** Govt. Lab. Publ. 29; 10, 1905. —This species is rare in our locality and was found only once near a nipa swamp. It is typical of the alpine form of Benguet province. Specimen 7167, *A. D. E. Elmer*, Palo, Province of Leyte, Leyte, January, 1906.

7. **F. hauili Blco.** Fl. Filip. ed. 1; 884, 1837.—Very common in copses of the woods at sea level. The mature figs remain rather hard for a considerable time after falling and turn dull white. The leaves have glossy blotches on the upper dark green shining surface.

Specimen 7182, *A. D. E. Elmer*, Palo, Province of Leyte, Leyte, January, 1906.

8. **F. ampelas Burm.** Fl. Ind. 226, 1868.—An erect 10 m. high tree, with a 3 dm. thick stem; branches very numerous, slender, lax, the branchlets drooping; wood hard; bark smooth, grayish brown, that on the young twigs pub-

erulous. Leaves dry, brittle and subcoriaceous, scattered, dark green on upper side, paler beneath, scabrous on both surfaces, slightly inequilateral toward the base, 3 cm. wide, 10 cm. long, oblong, apex acute, base attenuate, margins entire; lateral nerves 5 to 7 pairs including the prominent basal pair; bud scales 6 mm. long, narrowly acuminate, scabrous; petiole also scabrous, 7 mm. long. Receptacles from 1 to 3 in the axils of leaves or in the axils of fallen leaves, globose, scabrous, 5 to 8 mm. in diameter, upon short tribracteate peduncles, soft and yellow when mature. Flowers male and gall only.

The much larger coarsely toothed leaves of *F. asperior Miq.* distinguishes it at once from our species. Specimen 7178, *A. D. E. Elmer*, Palo, Province of Leyte, Leyte, January, 1906.

9. F. quercifolia humilis (Roxb.) King Ann. Roy. Bot. Gard. Calc. 1; 78, 1887.—Shrub 3 m. high. Leaves dry, brittle, very rough, used by the Visayans for polishing purposes. Figs scabrous, axillary, yellowish, or when soft purplish.

Doubtfully referred here since it is very variable and consequently many specific names have been proposed for different forms. Specimen 7179, *A. D. E. Elmer*, Palo, Province of Leyte, Leyte, January, 1906.

10. F. manilense Warb. in Frag. Fl. Philip. 3; 199, 1905. *F. rudis arborea Elm.* Leaf. Philip. Bot. 1; 54, 1906.—An 8 m. high widely spreading tree; older bark finely checked, that on the branchlets gray. Leaves chiefly along the ends of the twigs, chartaceous, obovate to obovate oblong, apex abruptly short acuminate or slenderly cuspidate, dark green above, paler beneath, base rotund or narrowly semicordate or simply auriculate, edges entire or finely dentate and more or less involute, pubescent on the prominent nerves beneath. Receptacles hispidulous when young, ultimately glabrate, in small clusters of the fallen leaf axils along the slender branches below the leaves, 7 mm. in diameter, nearly globose with a compressed apex, wine color when fully mature, soft and juicy, quite palatable. Only one tree observed on a wooded dry hillside at 150 meters.

Dr. Warburg writes that this species can be easily distinguished from *F. rudis Miq.* of the Celebes and its nearest ally, by the scant pubescence, entire leaves and by the characteristic grayish white bark. Specimen 7171, *A. D. E. Elmer*, Palo, Province of Leyte, Leyte, January, 1906.

11. F. heteropoda Miq. Ann. Mus. Lugd. Bat. 3; 232, 1867.—Small erect trees 5 m. high, branched above the middle; stem about 15 cm. in diameter; bark mottled with grayish white. Leaves few, arranged in 2 to 3 opposite pairs at the ends of the twigs, very unequal, ovate or oblong ovate, 1 to 4 dm. long including the petiole, 7 to 20 cm. wide, base broadly cordate, apex abruptly acute to acuminate, membranous, less green beneath, hispid on both sides but especially beneath, edges entire or shallowly dentate; nerves brown, 7 to 9 pairs including the 1 to 2 basal pairs, ascendingly curved, faintly united at the ends, prominent beneath but quite conspicuous on the upper surface, larger reticulations parallel; petiole 3 to 8 cm. long, scabrous; stipules deciduous, 12 mm. long, lanceolate, obtuse, submembranous, finely pubescent on both sides; bud scales slenderly acuminate.

Receptacles hispidulous, 12 mm. in diameter, yellow when mature upon the tree but turning reddish after falling, quite soft, subglobose, frequently verrucose, base more tapering into a 2 to 3 cm. long yellowish peduncle which is more or less obscurely bracteate, reddish umbilical scales forming a shallow cone, densely clustered upon short tubercles of the stems and larger branches; male and gall flowers subtended by fine bristle like hairs; staminate ones monandrous, concealed by the inner imbricate umbilical scales, closely surrounded by 4 free and entire perianth segments which are very similar to the umbilical bracts; filament 1 mm. long, dark brown, tumid especially at the base, glabrous; anther oblong, 1 mm. long, emarginate at the base, 0.75 mm. thick, ventrally curved; gall flower subsessile or pedicelled, subtended by 3 to 5 thin hyaline brown and linear perianth segments of unequal lengths; its pedicel slender, 0.75 mm. long, enlarged toward the apex, glabrous; ovary subglobose or oblong elliptic, shining smooth, terminated by a sublateral 0.75 mm. long dark brown style which bears a small emarginate stigma.

Collected in copses and light woods at sea level. Quite common and very fructiferous—on some trees the figs completely covering the stems. From *King's* plate and description in the Ann. Roy. Bot. Gard. Calc. 1; 78, 1887, plate 96, it is nearly typical, although this species has hitherto been known only from the island of Halmaheira in western Celebes. Because of its fruits on tubercles of stems and larger branches this species should be classed under *Covellia*. Specimen 7336, *A. D. E. Elmer*, Palo, Province of Leyte, Leyte, January, 1906.

12. F. benguetense leytense n. var.—A spreading 8 m. high tree; bark smooth and grayish white. Leaves subcoriaceous, lucid green on upper surface, duller and with a few strigose hairs along the nerves beneath, broadly oblanceolate, 14 cm. long, 6 cm. wide above the middle, acute at the apex, base obtuse or rounded and obscurely inequilateral; veins ascendingly curved, 7 to 9 pairs, reddish brown; petiole 1 to 2 cm. long, strigose or with age becoming glabrous; bud scales 1 cm. long, brown, acuminate, glabrous.

Receptacles chiefly in the leaf axils or in the axils of their scars, usually in pairs, smooth, hard, pyriform, 2.5 cm. long, 12 mm. in diameter above the middle, with a prominently raised umbilicus; peduncles about 5 mm. long, subglabrous, terminated by 3 acute and subglabrous bracts; fertile female flowers 3 to 4 mm. long; pedicel of the mature flower 2 mm. long, slender, obscurely jointed at a trifle below the middle, glabrous; perianth equalling the pedicel, tightly enclosing it below the middle, inflated above this, glabrous, brown, gamophyllous or obliquely truncate and obscurely bilobed; ovary subcompressed, obovoid, glabrous, less than 1.5 mm. long; style 1 mm. long or longer, glabrous and slender, sublateral, brown, recurved in age, the stigma slightly thicker and darker brown.

Type specimen 7174, *A. D. E. Elmer*, Palo, Province of Leyte, Leyte, January, 1906. It chiefly differs from the species in being a spreading tree whose true pyrifrom receptacles are either solitary or in pairs and more or less scattered along the branchlets. Typical *F. benguetense Merr.* also occurs in this same locality.

13. F. fiskei n. sp.—Shrubby, 3 to 5 m. high, usually branched from below the middle; wood quite hard and tough; bark brown, younger bark yellowish, set with fine spinulose hairs which arise from minute cones. Leaves ascending, frequently distichously arranged, very unequal, from 5 cm. to 3 dm. long and from 4 to 12 cm. wide across the middle, dry and quite brittle, inequilateral, base unequally subcordate, apex acute or acuminate, upper surface usually shining pale green and sparsely scabrous, beneath hispid, especially along the nerves, oblong; margins involute, undulate, apiculate or toward the apex grossly dentate, veins and reticulations very prominent beneath, yellowish green or straw color, 4 besides the midrib radiating from the base, about 6 primary pairs intermixed with secondary ones, the arching ends anastomosing; petiole uniformly short, stout, hispid, about 8 mm. long, narrowly acuminate, subglabrous.

Receptacles solitary or only in small clusters, very variable in size, from 5 to 15 mm. in diameter, subglobose, puberulent scabrous, yellowish red when mature, subsessile or upon 1 cm. long peduncles, either in the leaf axils or in the axils of their scars, upon the branches and stems and even upon the exposed roots, our specimens only with gall and male flowers; stamens monandrous, 2.5 mm. long; pedicel 1.5 mm. long, slender, glabrous, often with a stipular appendage from the base; filament proper sparsely ciliate at the base and provided with a rudimentary pistil; anther 1 mm. long, elliptic oblong; perianth of 3 distinct hyaline segments which are smooth, oblanceolate and 2 mm. in length; gall flower 3 mm. long; pedicel 1 mm. long; ovary globose, nearly 1.5 mm. in diameter, smooth and shining; style brown, glabrous, sublateral, 0.75 mm. long, clavate.

Type specimen 7324, *A. D. E. Elmer*, Palo, Province of Leyte, Leyte, January, 1906; also sterile specimen 7185, from the same locality. It is quite common in shrubberies of low dry hills and in sparse woods in which the latter number with the large leaves was collected. Apparently it is related to

F. semicordata Miq., which to our knowledge does not extend to the Philippines. Named in honor of *Mr.* and *Mrs. J. L. Fiske*, teachers in Leyte.

14. F. guyeri n. sp.—A 3 m. high shrub, with slender lax branches; wood rather hard; bark thin, brown, smooth. Leaves membranous, usually descending, frequently a trifle inequilateral, subsessile or upon 3 mm. long pulverulous peduncles, base obtuse, apex slenderly caudate, lanceolate, 5 to 12 cm. long, 1 to 3 cm. wide, shining green above, paler beneath, edges entire; veins 3 from the base in addition to the 3 to 5 primary pairs; bud scales 5 mm. long, narrow and slenderly acuminate.

Receptacles solitary or in pairs from the leaf axils upon slender 1 to 2 cm. long glabrous peduncles which are subpendulous, glabrous, reddish when mature, the younger ones usually provided with a few bracts, globose, 6 mm. in diameter, the umbilicus only slightly raised; syconium becoming soft and bristly ciliate on the interior; male flowers monandrous, beneath the umbilical scales, 2 mm. long: pedicel less than 0.75 mm. long, glabrous; stamen oblong to elliptic, less than 0.5 mm. long, truncate at the apex, emarginate or lobed at the base; perianth united at the base, glabrous, hyaline, white but turning brown with age, mostly with 5 linear or oblanceolate segments which exceed and enclose the anther prior to anthesis; gall flowers 3 mm. long; pedicel 1.5 mm. long, also glabrous, slender; ovary subglobose, smooth, hard, 0.75 mm. in diameter, with a 0.5 mm. long sublateral dark brown style; perianth united about the pedicel, its 4 or 5 segments oblanceolate and exceeding the ovary with the style.

Type specimen 7172^a, *A. D. E. Elmer*, Palo, Province of Leyte, Leyte, January, 1906. Judging from fruit and leaves alone it is very similar to *F. fastigiata Elm.*, but that species grows in open alpine rocky places while the species here proposed as distinct inhabits the woods of the foothills. This difference in habitat may account for *F. guyeri Elm.* having slenderer branches, larger and more membranous leaves. Besides these well marked field characters there are also floral differences and the hairy inner surface of the syconium, so pronounced in our specimen, is apparently wholly lacking in *F. fastigiata Elm.* The author has also collected it in the provinces of Sorsogon and Tayabas of Luzon. Again, it is closely allied to *F. acuminatissima Miq.* which however has pubescent receptacles, leaves and young twigs. Named for *Mr. H. E. Guyer*, a teacher in Leyte.

15. F. carpenteriana n. sp.—An erect 4 m. high tree with few divaricately spreading branches; wood very soft; bark brown, containing very little milky sap; bark of twigs covered with setose reddish brown hairs. Leaves dry, membranous, dark green and blotched above, paler beneath, scattered along the slender branchlets, about 2 dm. long, 6 cm. wide above the middle, apex long acuminate or caudate, base obtuse rounded truncate or obscurely subcordate, mostly oblanceolate, the lower half inequilateral, with entire margins, bristly pubescent beneath, sparsely so above; veins and reticulations very evident from beneath, reddish brown, the 7 to 9 lateral pairs ascendingly curved; petiole setosely dark brown pubescent, 1 cm. long; bud scales 12 mm. long, brown, membranous, glabrous, sharply acuminate.

Receptacles solitary or in pairs, from the leaf axils or in the axils of their scars, subsessile or upon 1 to 3 mm. long peduncles, subglobose, frequently irregular in shape, 10 to 15 mm. in diameter, hispidly brown pubescent, subtended by 3 obtuse bracts, its surface smooth or faintly ridged, apex in most of the fruits subcompressed, apparently turning yellowish when fully mature; fertile female flowers 4 mm. in length; pedicels 1.5 mm. long; perianth nearly 2 mm. long, thin, glabrous, gamophyllous, obliquely truncate at the apex, saccate above the middle; ovary yellow or brownish red, more or less pulverulent, elliptic or obovoid, subcompressed, the back nearly straight, the opposite edge much curved, at most 1.5 mm. long, 1 mm. across the widest portion; style glabrous, 1 mm. long, slender, yellow except the slightly thickened dark brown stigmatic part.

Type specimen 7177, *A. D. E. Elmer*, Palo, Province of Leyte, Leyte, January, 1906. This is a very rare species only observed along a stream of densely shaded woody ravine at 300 meters. Differs from *F. umbonata Reinw.* in having larger, less coriaceous leaves and the base of the receptacle provided with bracts. Named in honor of *Mr.* and *Mrs. B. C. Carpenter*, teachers in Leyte.

V. COVELLIA.

Flowers unisexual; male flowers in the same receptacles as the gall flowers, monandrous, the perianth of 3 to 4 distinct pieces; female flowers in separate receptaclès from the males and galls, pedunculate or sessile; the perianth gamophyllous, much shorter than the ovary, or wanting, rarely consisting of 4 or 5 pieces; the receptacles on long subaphyllous branches issuing from near the base of the stem, often sub-hypogaeal; or on shortened branchlets or tubercles from the stem and larger branches, or axillary; shrubs or trees, never epiphytes or climbers.

16. F. minahassae Miq. Ann. Mus. Lugd. Bat. 3; 231, 1865-6.—This tree is very constant throughout our Archipelago, with rough hispid leaves and branches. The persistent bracts often remain long after the leaves have fallen. A round topped tree, 8 m. high, in the dry hill country at 200 meters.

Specimen 7188, *A. D. E. Elmer*, Palo, Province of Leyte, Leyte, January, 1906.

17. F. nota (Blco.) Merr. Govt. Lab. Publ. 17; 10, 1904. *F. aspera nota Blco.* Fl. Filip. ed. 1; 677, 1837.—This species is remarkably constant in habitat as well as in stature, in flowers and in leaves. Figs densely clustered on short tubercles of the stem and larger branches.

Similar to *F. satterthwaitei Elm.*, but that species has differently shaped receptacles and glabrous leaves. Specimen 7182, *A. D. E. Elmer*, Palo, Province of Leyte, Leyte, January, 1906.

18. F. barnesii Merr. Govt Lab. Publ. 17; 12, 1904.—This species varies considerably in size and shape of its leaves and in pubescence. The receptacles when mature are pale white, smooth and verrucose.

It is externally distinguished from *F. mindoroensis Merr.* and *F. corona King* by its fuliginously colored pubescence and by the base of the receptacle rounded, not contracted into a peduncle like stalk. Specimen 7339, *A. D. E. Elmer*, Palo, Province of Leyte, Leyte, January, 1906.

19. **F. satterthwaitei n. sp.**—Tall 12 m. high tree with a trunk 4 dm. thick; branches divaricate or toward the top ascending; young bark grayish brown, smooth. Leaves chiefly toward the ends of the twigs but not clustered, dark green above, paler beneath, subcoriaceous, glabrous on both sides or the nerves beneath with a few strigose hairs, elliptic to oblong, usually equally sided, 2 dm. long and 8 cm. wide across the middle but frequently much larger or smaller, the apex short acute, base obtuse or rounded, rarely acute, margins entire or obscurely crenately toothed; nerves ascending, prominent beneath, dark brown, about 9 pairs, secondary nerves fine and transverse; petiole stout, subglabrous, 2 to 3 cm. long; bud scales glabrous, brown, 15 mm. long, acuminate.

Receptacles in dense large clusters upon short branched tubercles of the stem and larger branches, upon 15 mm. long nearly glabrous peduncles, glabrous, obovoidly compressed, 15 mm. high, 25 mm. in diameter, its base rounded and subtended by 3 rather thick short acute bracts, apex usually concave with prominent ridges, umbilicus somewhat raised but its scales not protruding, yellowish white when mature, its surface more or less dotted with lenticels; fertile female flowers 3 mm. long, glabrous, upon slender glabrous almost 2 mm. long pedicels, younger ones subesessile; base of the pedicel dark brown and tumid, provided with the gamophyllous perianth; ovary dark brown, ovoid to obovoid or ellipsoid, bearing a terminal style; perianth 2 mm. long, glabrous, the upper half inflated, its rim oblique and irregularly toothed; style glabrous, slender, reddish brown, 1.5 mm. long, usually curved, bearing a thickened lighter colored stigma; ovary brownish, rugulose, apex of most of the flowers tapering.

Type specimen 7181, *A. D. E. Elmer*, Palo, Province of Leyte, Leyte, January, 1906. This species of figs is quite rare in this locality and inhabits the woods of the fertile valley of the Bañgon River. It is relates to *F. fistulosa*

Reinw., but with larger differently shaped receptacles which are never solitary or in pairs from leaf axils or from the axils of their scars. Named for *Mr. G. W. Satterthwaite*, a teacher in Leyte.

20. F. cassidyana n. sp.—An erect small tree 6 m. high, with spreading branches; wood very soft, white; bark of the two or three year old branches conspicuously grayish white and smooth; young bark light brown, covered with reddish brown setose hairs which mostly arise from minute conical papillae. Leaves several at the ends of the twigs, much spreading, dry, membranous, equally harsh on both sides, dark green above, lighter beneath, upper surface cinereous pubescent especially along the nerves, lower surface covered with a short soft brown pubescence, very unequal in size, average ones 2 dm. long by 1 dm. wide just above the middle, apex abruptly tapering into an acuminate point, sides usually equilateral, base broadly cordate, broadly and obscurely pandurate, margins finely serrate or obscurely toothed; primary nerves 5 to 7 pairs, ascending, prominent beneath; petiole 1 to 3 cm. long or even longer, hispidly brown pubescent, stout; bud scales 15 mm. long, acuminate, pubescent.

Receptacles hispidly brown pubescent, upon 12 mm. long peduncles of short branched numerously bracteate tubercles of the stem, subtended by 3 membranous bracts, about 5 cm. in diameter when mature, obovoid, the base slightly tapering toward the 1 cm. long peduncles, apex broad and deeply sunken; syconium densely covered with long bristle like hairs of unequal lengths; either rudimentary or neutral flowers enveloped by the inner series of the umbilical scales; immature fertile female flowers 3 mm. long; its pedicels from 0.5 mm. to 1 mm. long, glabrous, falsely articulate at about the middle, dark brown above the articulation, paler below this; ovary glabrous, obovoid, subcompressed, 0.5 mm. long in the receptacles; perianth inserted upon the articulation, apex truncate or in the young specimens 3 to 5 sharply toothed and tightly subtending the base of the ovary; style filiform, sublateral, usually curved, the stigmatic portion subclavate and lanose pubescent, otherwise glabrous.

Type specimen 7169, *A. D. E. Elmer*, Palo, Province of Leyte, Leyte, January, 1906. This rare species has some affinities with *F. obpyramidata King* but can be distinguished externally by its much larger receptacles which are not puberulent nor verrucose and are without vertical ridges. Named in honor of *Mr.* and *Mrs. T. H. Cassidy*, teachers in Leyte.

VI. EUSYCE.

Flowers unisexual, male and gall flowers in one set of receptacles, fertile female flowers usually in a distinct set of receptacles; male flowers with 2 stamens, rarely 1 or 3; receptacles small or often quite larger, axillary; scandent or erect shrubs or small trees, rarely epiphytal; the leaves alternate, softly hairy or glabrous, not scabrous, nor hispid.

21. F. odorata (Blco.) Merr. Govt. Lab. Publ. 17; 15, 1904. *F. hispida odorata Blco.* Fl. Filip. ed. 1; 688, 1837. —Our specimen is a 4 m. high shrub. Leaves arranged in distichous rows along the slender half drooping branches. Figs pubescent and yellowish red when mature, in leaf axils or in the axils of fallen leaves.

Specimens from the forest of middle Luzon are tall trees, more membranous and with slightly different shaped leaves. The natives use the rough leaves for scouring purposes. Specimen 7172, *A. D. E. Elmer*, Palo, Province of Leyte, Leyte, January, 1906.

22. F. villosa Blm. Bijd. 441, 1825-6.—A much branched scandent shrub, with tough wood and brown bark; young twigs pubescent; leaves chartaceous, long, brown pubescent especially beneath, ovate to ovate oblong, 20 cm. long including the 2 to 3 cm. long petiole, 7 cm. wide, base broadly rounded, apex gradually tapering to an acute or acuminate point; nerves ascending, very prominent beneath, the 7 to 9 pairs united of the ends; stipule subpersistent, 2 to 3 cm. long, dry and brown, glabrous on the outside, strigose along the median vein of the ventral side, apex finely acuminate; bud scales 6 mm. long, sharply pointed, covered with numerous long brown hairs.

Of this species only a few sterile specimens were secured. However, we know that our form with pubescent receptacles has been collected in the province of Tayabas and has a southern range. The other form *F. propinqua Merr.*, with glabrous receptacles has a northern range, although I have also collected it in Tayabas province. Specimen 7170, *A. D. E. Elmer*, Palo, Province of Leyte, Leyte, January, 1906.

23. F. ruficaulis Merr. Govt. Lab. Publ. 17; 13, 1904. —In this locality only a few trees were noticed in damp soil of light woods at sea level near the edge of a nipa swamp. These healthy trees were about 8 meters high, their branches forming a round topped crown, branchlets comparatively few, thick. Leaves clustered at the ends of these branchlets, spreading and forming a solid shade. Receptacles densely clustered immediately below the leaves, melleus in color when fully mature, pedunculate from the axils of the large leaf scars.

This is the most southern limit thus far reported, although the variety *F. ruficaulis paloense Elm.* extends southward to Mindanao. Specimen 7165, *A. D. E. Elmer*, Palo, Province of Leyte, Leyte, January, 1906.

24. F. pseudopalma Blco. Fl. Filip. ed. 2; 473, 1845.— Erect palm like trees 2 to 3 m. high, its stem about 3 dm. in diameter; bark smooth, grayish white. Leaves arranged in irregular whorls only at the top of the stem, less than 3 cm. apart, slightly ascending and scattering; petiole short, thick, scurfy brown, 5 to 8 mm. long; blade very unequal in size, wholly glabrous, shining bottle green on the upper surface, yellowish green beneath, strongly membranous, 8 dm. long or less in the smaller ones, the larger at least 2 dm. wide, oblanceolate, apex rounded or obtuse, gradually attenuate from above the middle to the decurrent base where it bears short rounded or truncate lobes; margins variable, prominently undulate to sinosely serrate or toothed; midvein very stout and prominent beneath, the lateral 7 to 9 pairs little ascending and usually forked from the middle or above this; bud scales 3 cm. long, acuminate, glabrous, 8 mm. wide at the base.

Receptacles chiefly 2 in leaf axils, on each side subtended by subpersistent bract, upon a 6 mm. long peduncle with 3 short bracts, the peduncle erect while young but ultimately becoming reflexed between the stem and the leaf petiole; syconium shining smooth, bearing a few lenticels, purplish or wine color, broadly rounded at the base, 15 mm. in diameter and 2.5 cm. in length, ellipsoid, not compressed nor twisted; the apex conical, the upper half of the receptacle irregularly ridged, thick, very hard, terminated by very thick and hard umbilical scales.

A very common species in rich damp soil in the shrubberies of the woods. Specimen 7342, *A. D. E. Elmer*, collected at Palo, Province of Leyte, Leyte, January 1906, is the normal form with figs in the leaf axils; but specimen 7362 from the same locality is the only plant seen that had its figs in 1 to 3 dense clusters upon the stem.

25. F. ruficaulis paloense n. var.—Shrubby, 3 m. high wood of the younger branches very soft, thick and more or less watery; bark smooth, reddish brown. Leaves mostly toward the ends of the thick twigs, shining green and subglabrous on the upper surface, soft pubescent with umber colored hairs beneath, ovate, apex gradually tapering into an acuminate point, base cordate, 4 to 5 dm. long including the petiole, 2 dm. broad across the middle or a trifle below this, margins entire or obscurely undulate, and subinvolute; veins 3 to 5 from the base in addition to the 5 to 7 primary pairs, very prominent beneath, ascending, with fine connective arches at the ends, reticulations parallel and usually at right angles to the veins; petiole very unequal, 1 to 2 dm. long, soft pubescent; bud scales broadly triangular acuminate, 15 mm. long, densely covered with fine short hairs.

Receptacles in the leaf axils or scattered along the branchlets in the axils of their scars, broadly ovoid or subglobose, the apex frequently conical, densely pubescent, about 15 mm. in diameter and 2 cm. long, rounded base subtended by 3 subglabrous acute bracts, upon a 4 mm. long pubescent peduncle; fertile female flowers subsessile or upon 3 mm. long pedicels which are surrounded by yellowish white ciliate hairs; perianth 4-segmented, rigid and dark brown, acuminate, linear to lanceolate, glabrous except the finely ciliate margins; ovary ovoid, rugose, 12 mm. long, subcompressed, pointed at the apex, in the younger state tightly enclosed by the perianth; style 1 mm. long, thickest at the base, glabrous, dark brown above the middle.

Type specimen 7175, *A. D. E. Elmer*, Palo, Province of Leyte, Leyte, January, 1906. It is chiefly distinguishsd from typical specimens of middle Luzon by its larger less membranous leaves which are darker brown pubescent and more truly ovate in shape with cordate base and attenuately acuminate apex.

VII. NEOMORPHE.

Flowers unisexual; male and gall flowers in one set of receptacles; sterile female flowers with 2 stamens, the perianth inflated, of 3 to 4 membranous pieces; fertile female flowers smaller than the male or gall flowers; receptacles often very large, in fascicles from tubercles on the stem and larger branches; trees, rarely scandent, never epipytal.

26. F. latsoni n. sp.—A large tall tree, with a bole 17 m. long and 1 m. in diameter; branches thick, divaricately spreading; wood soft, white; bark not checked, conspicuously ferruginous, abundantly bleeding a milky white latex which soon turns gummy. Leaves confined to the ends of the thick and rigid twigs, unequal in size, coriaceous, lustrously shining on the upper surface, paler and duller green beneath, ovate or elliptic, 2 dm. long with the petiole, 1 dm. wide, abruptly contracted into an acute apex, base broadly subcordate rounded or sometimes obtuse, margin mostly undulate or subentire, wholly glabrous; nerves 4 to 7 pairs, ascending, conspicuous beneath; petiole glabrous, 3 to 9 cm. long in the medium sized leaves; bud scales about 10 mm. long, acute or acuminate, glabrous, brown.

Receptacles in small clusters upon very short unbranched tubercles of the branches, obovoid, 12 to 20 mm. in diameter, its surface smooth and yellow, bearing a few whitish lenticels, base tapering and subtended by 3 small obtuse bracts, apex broad and with a rounded saucer shaped concavity, umbiical scales conspicuously raised; peduncles 1.5 to 3 cm. long, slender, glabrous and brown; male and gall flowers only; male flowers in between the umbilical scales, diandrous, upon a thick 1 mm. long pedicel, surrounded by a thin brown colored subgamophyllous perianth which slightly exceeds the flowers; filaments 0.5 mm. long, glabrous; anthers oval or broadly elliptic, nearly 1 mm. long, gall flowers upon tumid 0.5 mm. long peduncles; ovary hard, obovoid, 1 mm. in diameter and 1.5 mm. long, subsessile, brown and smooth, subtended by a 3 to 5 lacerate or in the younger state subentire perianth; style yellowish white, 0.5 mm. long, mealy in appearance, arising from one side of the gall ovary, 0.75 mm. in diameter, short clavate and with a pronounced sunken apex; the stigma with its style does not increase in length while the ovary does.

Type specimen 7178, *A. D. E. Elmer*, Palo, Province of Leyte, Leyte, January, 1906. This is the most stately erect fig tree thus far known in the Archipelago, and is met here and there in the wooded ravines of the foothills from northern Luzon to Mindanao. In the field it can always be recognized by its characteristic color of the bark and the abundance of latex it contains. In recent collections it has been determined as *F. variegata Blm.* from which it differs in having on an average longer petioles and shorter peduncles; receptacles smaller, not globose nor compressed at the apex, and not red with white streaks and dots. It is without much doubt *F. laevigata Blco.*, but this name is preoccupied. Named for *Mr. E. E. Latson*, a teacher in Leyte.

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LEAFLETS
OF
PHILIPPINE BOTANY

A NEW TRIGONOSTEMUM

BY

OTTO STAPF

SUBCRIPTION PRICE 2 CENTS PER PAGE.

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LEAFLETS OF PHILIPPINE BOTANY

EDITED BY A. D. E. ELMER, A. M.

Vol. 1. Manila, P. I., April 11, 1907. Art. 9.

A NEW TRIGONOSTEMUM

BY

OTTO STAPF.

(*Royal Gardens, Kew, near London, England.*)

* * *

Trigonostemum philippinense Stapf n. sp.—[*Euphorbiaceae*]; affine *T. heteranthe*, sed panicula rigidiore, latiore magis ramosa, ramis flore femineo terminatis, sepalis eciliatis, ovario verrucoso distinctum.

Arbuscula, 7 m. alta, inflorescentiis exceptis glabra, ramis gracilibus teretibus. Folia oblanceolata, basin versus longe attenuata, apice tenuiter acuminate, minute remote denticulata, 10-18 cm. longa, 5-6 cm. lata, papyracea, nervis secundariis utrinque 10-11, obliquis tenuibus; petioli 2-4 cm. longi, graciles. Inflorescentia terminalis, paniculata, pedunculo corciter 6 cm. longo suffulta, 10 cm. longa, 6 cm. lata, adpresse pubescens, ramis 5-3 cm. longis a medio vel superiores fere a basi ramulosis, ramulis inferne flores masculos solitarios vel fasciculatos, gerentibus et flore femineo terminatis; bracteae minutae; pedicelli masculi fere capilares ad 4 mm. longi; feminei robustiores, stricti, apice paulo incrassati, ad 12 mm. longi. Flos masculus: sepala 4, inaequalia, elliptica vel rotundato-elliptica, obtusa, 1.5 mm. longa parce adpresse pilosula, eciliata; petala 4, oblongo-elliptica, basi breviter contracta, 3 mm. longa, aurea; disci glandulae 4, obcordato-cuneatae; stamens 3, 1 mm. longa; antherae columnae, brevissimae incidentes, loculis ob connectivum dilatátum emarginatum distantibus. Flos femininus: sepala 5, inaequalia, ovata vel rotundato-ovata ad 2-6 mm. longa, adpresse pilosula, margine membranaceo; petala non visa; disci grandulae 5, sepalis oppositae; ovarium 3-lobum, verruculosum, 2 mm. altum; stigmata brevia, apice paulo dilatata, truncata; ovula solitaria.

Type specimen 8326, *A. D. E. Elmer*, Los Baños, Province of Laguna, Luzon, April, 1906. In very damp, shaded ravines of the forests of Mount Maquiling at 350 meters.

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OF
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SAPINDACEAE PHILIPPINENSIS NOVAE

BY

L. RADLKOFER

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LEAFLETS OF PHILIPPINE BOTANY

EDITED BY A. D. E. ELMER, A. M.

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SAPINDACEAE PHILIPPINENSIS NOVAE

BY

L. RADLKOFER.

(Royal Botanical Museum, Munich, Bavaria, Germany.)

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1. **Allophylus unifoliolatus Radlk. sp. nov.** Frutex; rami teretes, glabri, subflexuosi, cortice albo (usque ad folia summa subere albo obtecto); folia 1-foliolata, interdum rudimentis foliolorum lateralium minutissimis subulatis instructa, petiolo brevi supra complanato minutim puberulo; foliolum mediocre, elliptico-lanceolatum, breviter obtuse acuminatum, in petiolulum brevem (cum petiolo articulatum) attenuatum, a medio obsolete dentatum, rigidiuscule chartaceum, nervis lateralibus sat approximatis subtus magis quam supra prominentibus patulis, superioribus margine sursum curvatis et in dentes excurrentibus, laxe reticulato-venosum, glabrum nec nisi subtus in axillis nervorum pilosum, saturate viride, subtus pallidus, utrinque nitidulum, epidermide inferiore insigni cellulis magnis valde mucigeris illas epidermidis superioris aequantibus (et cum iis puncta pellucida minuta efficientibus) interjectis aliis minoribus stomatibus vicinis non nucigeris hic illic crystalla vel crystallorum concretiones sat magnas gerentibus; thyrsi simplices, folia dimidia vix aequantes, pedunculo brevi, laxe cincinnigeri, subglabri; flores mediocres, glabri; fructus cocci mediocres, obovoidei, glabri.

Rami 2-4 mm crassi. Folia petiolo 0,8-1,5 cm longo adjecto 8-18 cm longa, 4-7,5 cm lata. Thyrsi ca. 3 cm longi. Fructus cocci 8 mm longi, 6 mm crassi.

In Philippinarum insula Leyte: *A. D. E. Elmer* n. 7329! (Palo, m. Januario 1906, fr.).

2. **Aphania angustifolia Radlk. sp. nov.** Arbor; rami teretes, e fusco cinerascentes, lenticelloso-punctati, glabri; folia plerumque 3-juga, petiolo basi tumido lenticellis prominulis notato; foliola subopposita, anguste ovato-lanceolata, elongata, in apicem acutissimum sensim angustata, in petiolulos basi incrassatos attenuata, subcoriacea, nervis lateralibus remotiusculis patulis ante marginem adscendentibus et anastomosantibus subtus prominentibus, reticulato-venosa, glabra nec nisi subtus pilis perraris brevibus pachydermicis prope basin lateraliter affixis adpressis adspersa, livida, subtus obscuriora, utrinque subopaca, cellulis secretoriis raris instructa, crystallorum concretionibus prope paginam superiorem creberrimis, glandulis microscopicis basi immersis raris ornata, epidermide non nucigera; paniculae ad apices ramorum pluriramosae, ramis erectis thyrsoideis sat dense cymulas inferiores stipitatas, superiores subsessiles gerentibus, minutim puberulae; flores—(non visi); fructus 2-vel abortu monococcus, longius pedicellatus, coccis obovoideis glabris.

Rami ca. 4 mm crassi. Folia petiolo 3-5 cm longo adjecto ca. 25 cm longa; foliola cum petiolulis 5-8 mm longis 10-20 cm longa, 2,5-4 cm lata. Paniculae 12-20 cm longae. Pedicelli fructigeri ad 1 cm longi. Fructus cocci 12 mm longi, 9 mm crassi.

In Philippinarum insula Leyte: *A. D. E. Elmer* n. 7330! (Palo, m. Januario 1906, fr.).

3. **Dictyoneura sphaerocarpa Radlk. sp. nov.** Frutex; rami teretes, fusci, pilis minutis subsetaceis adpressis fulvopuberuli, dein glabrescentes; folia abrupte pinnata, petiolo tereti subtiliter striato rachique a medio linea elevata supra notata minutim puberulis; foliola ca. 16, alterna, oblonga, acuta vel subacuminata, supra medium utrinque remote obtuse 3-4-dentata, basi valde inaequilatera (latere interiore latiore) in petiolulos breves contracta membrancea, utrinque subtiliter reticulato-venosa, sparsim pellucido-punctulata, glan-

dulis lepidoideis raris adspersa subtusque in nervis laxe puberula, sicca flavescenti-viridia; panicula pauciramosa,, minutim puberula (fructigera tantum visa); fructus (generis) breviter pedicellati, calycis reliquiis suffulti, subglobosi, in stipitem brevissimum disco tomentoso cinctum contracti, pilis raris glandulisque minutis adspersi, loculicide bivalves, endocarpio sarcocarpium corrugatum crassitudine aequante rufescenti-villoso, abortu plerumque 1-spermi; semen ovoideum, nigro-fuscum, ventre tantum arillo brevi obductum.

Rami 6-8 cm crassi. Folia petiolo 5 cm longo adjecto ca. 30 cm longa; foliola inferiora et summa minora cum petiolulis 3 mm longis 5-8 cm longa, 2,5 cm lata, intermedia majora ad 13 cm longa 4 cm lata. Paniculae ca. 20 cm longae; pedicelli fructiferi 3 mm longi, puberuli. Fructus (siccus) diametro 8-10 mm, fusco-ruber. Semen 7-8 mm longum, 4-5 mm crassum.

In Philippinarum insula Leyte: *A. D. E. Elmer* n. 7157! (Palo, m. Januario 1906).

4. **Mischocarpus ellipticus Radlk. sp. nov.** Frutex; rami teretiusculi, striati, glabri; folia abrupte pinnata, petiolo rhachique teretiusculis striatis; foliola 6, subopposita, magna, late elliptica, acuminata, basi rotundata, sat longe petiolulata, integerrima, subcoriacea, glabra nec nisi glandulis microscopicis adspersa, nervis subtus prominentibus, lateralibus arcuato-adscendentibus in axillis foveola anguste urcolata notatis, reti venarum angusto utrinque prominente, subopaca, sicca pallide cinnamomea, cellulis secretoriis numerosis obscure pellucido-punctata, stomatibus crebris patelliformibus margine elevatis subtus instructa, epedermidis inferioris cellulis sparsim crystalla singula gerentibus; paniculae axillares, pauciramosae, robustae, dichasia stipitata subito in cincinnos 5-6-floros transeuntia gerentes, minutim sordide puberulae; flores sat pedicellati, petaligeri; petala elliptica, basi bisquamulata vel partim esquamata, glabra vel extus adpresse puberula, sepala ovata puberula cellulis secretoriis paucis (ut et petala ipsa) instructa vix superantia; discus adpresse puberulus; stamina glabra; germen hirsutum; fructus non visus.

Rami 7 mm crassi. Folia petiolo 6-7 cm longo adjecto CA. 25 cm longa; foliola cum petiolulis 15 mm longis CA. 18

cm longa, 7,5-10 cm lata. Paniculae ca. 30 cm longae; pedicelli 3-5 mm longi, infra medium articulati.

In Philippinarum insula Leyte: *A. D. E. Elmer* n. 7271! (Palo, m. Januario 1906, fl.).

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LEAFLETS
OF
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FREYCINETIA FROM LUCBAN

BY

A. D. E. ELMER

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LEAFLETS OF PHILIPPINE BOTANY

EDITED BY A. D. E. ELMER, A. M.

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FREYCINETIA FROM LUCBAN

BY

A. D. E. ELMER.

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Stigma 1 to 5.—*Oligostigma.*

1. **F. lucbanensis n. sp.**—Scandent, with few divaricate branches some of which are rather long and deflexed. Stems 5 cm. thick, gray, smooth, with very oblique rings from 3 to 8 cm. apart. Leaves crowded toward the apex in spirally twisted rows, mostly ascending, coriaceous, much lighter or yellowish green beneath, sides from the middle to apex involute, about 8 dm. long, 3 cm. wide, finely serrate on the margins toward the base and the midrib beneath toward the apex, strap like, very little attenuate toward the base, apex slenderly acuminate, the tip triangular and scabrous or minutely toothed. Pistillate spadices immature, 3, the individuals upon 3 to 5 cm. long peduncles, 7 to 12 cm. long, 2 to 3 cm. thick; fruits very numerous, 7 mm. long, 1 mm. thick toward the apex, slenderly columnar, set in contact the entire length except the apical portion which bears 2 to 3 stigmas.

Type specimen 8230, *A. D. E. Elmer*, Lucban, Province of Tayabas, Luzon, May, 1907. In swampy wooded regions at Bukal, a barrio between Lucban and Sampaloc.

2. **F. multiflora Merr.** in Philip. Journ. Sci. Vol. 2; No. 4, Sec. C, 259, 1907.—Scandent, widely branching. Stems

about 2 cm. thick, rigid, hard, gray, smooth; rings 2 to 3 cm. apart. Leaves paler green beneath, also rigid, linear or narrowly lanceolate, 2 cm. wide, 3 dm. long, toward the base somewhat attenuate, apex gradually acuminate, margins involute, entire or apiculate near the base; stipule parchment like, 1 cm. wide at the base, nearly 2 cm. long, with abrupt apex, clasping at the base. Infrutescence erect, 3 to 5-clustered; main peduncle 3 cm. long, 1 cm. thick; secondary peduncles triangular, 3 to 5 cm. long, 5 mm. thick, hispidly brown pubescent beneath the syncarpia, thickened at both ends, erect; pistillate spadices immature, 15 mm. thick, 5 to 13 cm. long, usually curved or subdivaricate. more frequently somewhat thickened at the apex, terete, hard; fruits 5 mm. long, the upper portion strongly angled, more or less subcompressed; stigmas 2 to 3, frequently divided.

Represented by 9006 and 8039, *A. D. E. Elmer*, Lucban, Province of Tayabas, Luzon, May, 1907. In woodlands of Mount Banahao from 600 to 800 meters.

3. **F. confusa n. sp.**—Scandent, numerously branched from the base, forming tangled masses. Stems 8 mm. thick, green, very wiry, its rings 15 mm. apart, smooth, yellowish; branches divaricate, slender and sparingly rebranched, subdeflexed but usually with suberect tips. Leaves gracefully recurved, thin, nearly equally shining green on both sides, rather numerous toward the ends of the twigs but those down lower much reduced and becoming bract like, at least 4 dm. long, 5 mm. wide, linear, the basal portion slightly attenuate and conduplicate, the apex gradually extended into a whip lash like point, the lower one third finely serrate along the margins; stipule 2 to 5 cm. long, 5 mm. wide, parchment like, abruptly terminating into a small fimbriate lobe, imbricately clasping. Infrutescence erect, much exceeded by the ascending leaves, main peduncle short, 8 mm. thick; secondary peduncles 2 to 3 cm. long, triangular, 3 mm. thick, with a scabrous yellowish pubescence from the apex down to below the middle; pistillate spadices immature, 3 to 4 or even 5, subglobose or broadly elliptic, 2 to 3 cm. long, a trifle narrower, crimson red when mature; drupes 7 mm. long, 3 mm. thick, the upper half free and angular, gradually tapering to the

round or subcompressed apex; stigmas normally 2 to 3, but occasionally with 4 or 5.

Type specimen 9007, *A. D. E. Elmer*, Lucban, Province of Tayabas, Luzon, May, 1907. It is common in the woodlands skirting the base of Mount Banahao at 650 meters. Apparently it is nearest related to *F. vidalii Hemsl.* but that species belongs to the following section.

STIGMAS 3 TO 10.—*Pleiostigma*.

4. **F. hemsleyi n. sp.**—Scandent, 7 m. high, sparingly branched. Stem rather tightly cleaving to its support, near the ground about 2 cm. thick, somewhat thicker in the leaf bearing portion. Leaves thick and leathery, in obscure spiral rows, usually subpendulous, scattering along the entire upper portion of the stem and along the branches, shining deep green above, paler beneath, 1 m. long or a trifle longer, 7 cm. wide, base gradually narrowed, apex shortly terminated into a short acuminate point, shallowly serrate on the margins, the midrib toward the apex beneath also serrate, the leaves 3 dm. below the inflorescence with purplish red bases; stipules apparently 10 cm. long and 2 to 3 cm. wide, smooth and rigid. Bracts subtending the terminal inflorescence fiery red and gradually increasing in size and green apical portions; pistillate spadices immature, 3, erect, upon 2.5 cm. thick and 15 cm. long peduncles, nearly terete, 8 to 13 cm. long, at least 3 cm. thick, green except the brown apices; the pedicels bearing the individual cones rather short and triangular; receptacle nearly 15 mm. thick; fruits 7 mm. long, numerous, 3 mm. thick, the upper one fourth free and obscurely angular, truncate, subterete or more or less flattened; stigmas 5 to 7.

Type specimen 7849, *A. D. E. Elmer*, Lucban, Province of Tayabas, Luzon, May, 1907. Climbing upon tree trunks in open woods around the base of Mount Banahao at 800 meters. Named in honor of *Dr. W. Botting Hemsley*.

5. **F. dilatata Merr. ~~sp.~~** (in Mss.)—Scandent and quite numerously branched, the branches half drooping but sparingly rebranched. Stems and larger branches 2 cm. thick, with rings 15 mm. apart, smooth, yellowish gray, provided with short rather sharply conical similarly colored

spines. Leaves subcoriaceous, in obscurely twisted rows, the upper portion recurved, the three year old still persistent, 3 cm. wide, 8 dm. long, strap like, apex gradually tapering to an acuminate point, quite rigid, paler green beneath, edges finely serrate or dentate toward the base, midrib beneath scabrous toward the apex. Main peduncles short, 1 cm. thick; secondary peduncles subcompressed, 2 to 3 cm. long, 5 mm. thick, pale red; lower bracts of inflorescence dark wine color and with very slender ascending green tips; inner bracts much shorter, merely acute, orange red; staminate spadices 3 to 5-clustered, slenderly fusiform, 5 to 8 cm. long, 8 mm. in diameter, orange red with brown anthers and dirty yellow filaments, possessing a strong wine odor.

Represented by 9008, *A. D. E. Elmer*, Lucban, Province of Tayabas, Luzon, May, 1907. Quite rare on steep slopes of large ravines at 700 meters on Mount Banahao.

6. **F. banahaensis n. sp.**—Scandent and forming tangled loops. Stems and branches terete, 3 to 5 cm. thick, smooth, yellowish brown, with conspicuous rings 2 to 5 cm. apart. Leaves densely clustered toward the ends of the branches in obscure spirally twisted rows, the average one 1 m. long, gradually tapering from below the middle to the very slender whiplash like tips, 3 cm. wide, entire except the finely serrate basal margins, rather thick and rigid, shining green above, much paler beneath, margins strongly recurved above the middle; stipules marcescent and persistent on the leaf bases, 1 cm. wide at the base, gradually tapering to the apex, 3 to 5 cm. long. Leaf like bracts subtending the inflorescence creamy white, those immediately beneath the flowering stalk much shorter, thicker, and with broader bases; staminate and pistillate spadices with an odor of fresh baked bread, 3 to 7 in a cluster and terminating the branches, very unequal in length and thickness, when mature probably 3 cm. thick and 12 cm. long or somewhat larger; main peduncles 8 mm. long, erect, 2 cm. thick; secondary ones triangular, averaging 5 cm. long, 1 cm. thick; fruit 8 mm. long, very numerous, apex obscurely rounded or truncate. the upper 2 mm. free, hard, obtusely angled; stigmas 5 to 7.

Type specimen 7902, *A. D. E. Elmer*, Lucban, Province of Tayabas, Luzon, May, 1907. It is extremely common from 800 to 2000 meters on Mount Banahao, forming dense jungles with other shrubs and small trees. It is nearest related to *F. scabripes Warb.* but with larger leaves which are less toothed and more slenderly tapering; with thicker peduncles and apex of fruit not subclavate nor sulcately angular.

7. **F. palawanensis Merr.** (in Mss.)—Scandent upon trees, 7 m. high. Stems beset with short scattered spines, 2.5 cm. thick, rather soft in texture but quite tough, numerously branched and forming tangled bushes; branchlets subdeflexed, light gray or yellowish, heavy. Leaves succulent, equally green on both sides, heavy and pendulous, 3 dm. long, 8 mm. wide, margins involute, slightly attenuate toward the base, apex slenderly tapering into a fine point, entire, linear; stipules lacerate, 15 mm. long or longer, one half that in width, quite thin, clasping and rather persistent to the stem. Staminate spadices 3, cylindric, 3 to 5 mm. thick, 2 to 3 cm. long, upon 1 to 2 cm. long peduncles, cream color, with a faint burned leather odor; subtending bracts of the same color, very thick, with broad bases and acute to acuminate apices; immature pistillate spadices also 3, upon triangular 5 mm. thick and 1 to 2 cm. long secondary peduncles, cylindric or columnar, 2 to 3 cm. long, 6 to 10 mm. thick; fruits 3 to 5 mm. long, about 2 mm. thick, the upper one third free; circular truncate apex bearing 3 to 5 or even as many as 7 stigmas.

Staminate specimen represented by 9009 and pistillate specimen by 8226, *A. D. E. Elmer*, Lucban, Province of Tayabas, Luzon, May, 1907. It was only here and there noticed in damp woods at 700 meters on Mount Banahao, along water courses especially in the vicinity of cataracts. In the field it is easily recognized by its heavy succulent foliage and by the profuse subpersistent lacerated stipules.

8. **F. merrillii n. sp.**—A tall climber. Stems wiry, 12 mm. thick, smooth, yellowish brown; branches few but rather long and widely spreading, usually deflexed; rings 2 to 5 cm. apart. Leaves scattering along the branches but more

numerous toward the ends, leathery, paler green beneath, flat, heavy, usually hanging, oblong, 2 dm. long, 5 cm. wide, apex acute, base attenuate, the margins finely serrate especially toward the base, striate; stipules 2 to 3 cm. long, thin, brown, adnate and clasping the stalk toward its base, 1 cm. wide above the middle, apex rounded, its nerves arching above the middle. Main peduncle usually recurved, 10 to 15 cm. long, 8 mm. thick; secondary peduncle triangular, 3 to 4 cm. long, 5 mm. thick; pistillate spadices immature, globose, 3 to 5-clustered, 4 cm. in diameter; fruits 12 mm. long, columnar, 4 mm. thick just below the middle, the upper two thirds gradually tapering and angular; rim of apex hard, truncate, bearing 5 to 7 stigmas.

Type specimen 9010, *A. D. E. Elmer*, Lucban, Province of Tayabas, Luzon, May, 1907. It is very luxuriant in woods overhanging river banks especially near rapids. Named after *Mr. E. D. Merrill.*

9. **F. globosa Merr.** in Philip. Journ. Sci. Vol. 2; No. 4, Sec. C, 260, 1907.—Stems sparingly branched from near the base, tightly cleaving to a small tree trunk, climbing up 5 to 8 m., 1 cm. in diameter, smooth, hard and brown or when old becoming gray; rings at most 1 cm. apart; branches divaricate, sparingly rebranched, subpendulous, 1 to 3 m.long, forming bushes toward the top. Leaves mainly upon the growing shoots, rather dense and arranged in 3 rows (2 lateral rows and an upper middle one), usually subdeflexed, 2 to 3 cm. apart, 4 to 6 cm. long, 1 to 2 cm. wide, oblong or narrowly ovate to elliptic, with abruptly contracted and twisted bases, acute and subfalcately twisted apices, subcoriaceous, striate, the margins and midnerve beneath finely serrate, those leaves between the annular growths of the branches much smaller and even bract like; stipule 5 to 10 mm. long, the blunt apex ciliate, becoming marcescent, about 3 mm. wide. Infrutescence terminal, upon 1 cm. long main peduncle which is about 4 mm. in diameter; syncarpia immature, 2 to 3, upon 1 to 2 cm. long and slender secondary peduncles; receptacles 1 cm. long and 5 mm. thick, oblong; stigmas 3 to 5; mature fruits not seen.

Represented by 9011, *A. D. E. Elmer*, Lucban, Province of Tayabas, Luzon, May, 1907. Only one plant was observed in very humid forests at 500 meters on the road between Lucban and Sampaloc.

10. **F. warburgii n. sp.**—Scandent, branched but not forming dense bushes. Stems rigid and wiry, hard, smooth, brown, 15 mm. thick; branches crooked and ultimately subdeflexed; rings 2 to 3 cm. apart. Leaves coriaceous, scattering along the branches rather evenly, divaricately ascending, often yellowish green beneath, 3 cm. wide, 2 dm. long, broadly linear, gradually tapering toward the acute apex, finely dentate toward the base, midrib beneath with only a few fine scattering teeth; stipules membranous, adnate, 3 to 5 cm. long, with fimbriate auriculate tips, usually tearing off the blade and persisting upon the stem. Infrutescence upon a 2.5 cm. long suppendulous or recurved stalk; pistillate spadices in 3 to 5 radial clusters, subglobose, 3 to 5 cm. long, about 3 cm. in diameter, each upon stout green 15 mm. thick peduncles. Bacca when mature soft, smooth, deep crimson red, the basal portion giving off a water colored sweet and sticky substance, 10 mm. long, 8 mm. in diameter across the middle, when fresh roundly angled, gradually tapering to the base, abruptly tapering to the apex, only the upper half free; stigmas 4 to 6; seeds light straw color, 2 mm. long, 0.5 mm. wide, flattened and fluted on each side, with blunt ends.

Type specimen 8229, *A. D. E. Elmer*, Bukal, a barrio near Lucban, Province of Tayabas, Luzon, May, 1907. Only one specimen was observed in a half swampy wooded region at about 500 meters. Apparently related to *F. spectabilis Solms-Laub.* from New Caledonia, but with twice the number of stigmas and nearly globose syncarpia. Named in honor of *Dr. Otto Warburg.*

11. **F. monocephala Elm.** Leaf. Philip. Bot. 1; 78. 1906.—A fine and numerously branched climber, festooning trees in damp deeply shaded woods at 750 meters on Mount Banahao. Stem and main branches brown, the thickness of a goose quill. Leaves delicate, equally dark green on both sides, cilliate towards the base; stipules 5 mm. long,

2 mm. wide, transparent, ciliate, on the margin. Infrutescence terminal, usually with a solitary spadix but occasionally with two.

Represented by 9012, *A. D. E. Elmer*, Lucban, Province of Tayabas, Luzon, May, 1907. This plant is rare. Its altitudinal range is very constant.

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LEAFLETS
OF
PHILIPPINE BOTANY

SOME NEW LEGUMINOSAE

BY

A. D. E. ELMER

SUBSCRIPTION PRICE 2 CENTS PER PAGE.

MANILA, P. I.

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LEAFLETS OF PHILIPPINE BOTANY

EDITED BY A. D. E. ELMER, A. M.

Vol. I. Manila, P. I., October 21, 1907. Art 12.

SOME NEW LEGUMINOSAE

BY

A. D. E. ELMER.

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Luzonia n. gen.—This new genus is nearest related to *Canavalia* from which it is chiefly distinguished by its nearly equal 2-lipped calyx; corolla not much exerted, with wings and keels nearly equalling the banner. Its leaves are suggestive of *Canavalia*, but the woody nature and the slender spicate inflorescence of our specimen are different. The characters of the calyx and the corolla debar it from being considered a *Dioclea* or *Pueraria*.

Luzonia purpurea n. sp.—A scandent and widely spreading shrub, at most 10 m. high. Stems terete, 3 to 5 cm. thick, flexible, its yellowish porous wood filled with water; bark brown, thinly checked toward the base, lenticelled; branches rather many, the ultimate ones greenish brown, covered with light gray lenticels. Leaves alternate, ascending, submembranous, lucid dark green above, duller beneath, glabrous, trifoliate and articulate; the lateral leaflets inequilateral, base rounded, apex abruptly terminating to a short acumen, elliptic or the terminal leaflet broadly obovate, in the fresh state dorsally recurved, from 5 to 15 cm. wide, 7 to 18 cm. long, the terminal leaflet usually larger; petiole about 1 dm. long, extended and bearing the terminal leaflet, glabrous except the articulate thickened base; the short axillary gland subtended by 2 acuminate 4 mm. long pubescent bracts; nerves 7 to 9 pairs, ascending, prominent beneath and especially toward the base, with a few brown scattering hairs, reticulations minute but numerous; petiolule 8 mm. long, persistent. Inflorescence spicate, 3 to 9 dm. long, suberect, its rachis green and quite rigid, lateral from the axils of the branchlets or from the axils of fallen leaves; buds very deep purple, clustered upon small erect heads terminating the 3 to 5 mm. long ascending peduncles; flowers caducous, also somewhat rigid and half succulent, sessile, entirely purple except the banner which has a yellow streak extending from the base to the middle; calyx subterete, 16 mm. long, divided into nearly 2 equal lobes, the lower lip a trifle broader and terminated by 3 short teeth, deep purple, glabrous on the exterior, yellowish pubescent on the interior; banner pandurate, nearly 3 cm. long, the base abruptly contracted into a short claw, 15 mm. wide above the middle, apex roundly 2-lobed, the upper half erect; wings 2.75 cm. long, with a sharp bend just below the middle, the lower portion curved and slenderly clawed, the upper one half oblong, conspicuously deflexed, apex obtuse; keels nearly straight, 2.75 cm. long, the basal one third slenderly clawed, the upper edge subentire or obscurely toothed, the blunt tip slightly curved upwards, 7 mm. wide; stamens enclosed by the keels, monodelphous, curved, pinkish, the short free filaments unequal in length; anthers erect, about one half of them are fertile, the rest sterile and crowded in between the fertile ones, 4 mm. long, oblong, yellowish brown, hard and rigid, equally emarginate at both ends, attached to the filaments on the back below the middle; ovary sessile, pubescent as is also the lower portion of the curved style; stigma with an obscurely fringed ring, terminal, barely exceeding the anthers which usually cluster beneath it.

Type of flowering specimen 9013, *A. D. E. Elmer*, Lucban, Province of Tayabas, Luzon, May, 1907. It was first discovered in a wooded ravine at the base of Mount Banahao at 775 meter altitude, where it climbed large trees and formed tangled masses over their tops. It was again observed in a small gulch near Lucban at a lower altitude, sprawling over the thickets.

Cynometra densiflora n. sp.—A round topped rather bushy tree, 15 to 20 m. high, with white hard wood; main branches ascending, the ultimate ones forming dense masses; twigs quite short, crooked and gnarly; bark on the branches gray, that on the twigs covered with small brown lenticels. Leaves alternate, bipinnate; petiole 5 cm. long or longer in the larger leaves, somewhat swollen at the base; petiolule smaller but similar; leaflets in 3 to 5 opposite pairs, subcoriaceous, lucid green above, glaucous or somewhat yellowish green beneath, umber brown when dry, divaricate, unequally sided, with recurved tips and dorsally conduplicate sides, ovate to oblong, about 7 cm. long, 3 cm. wide, apex subfalcate and acuminate, base rounded; nerves 3 to 5 on each side of the prominent midvein, reticulate, the lateral ones more pronounced on the upper surface, shining brown; leaflet petiole 4 mm. long. Inflorescence terminal or subterminal, quite heavy and in the bud state succulent, 2 to 3 dm. long, cymosely paniculate, the terminal axis shorter and usually bearing the earliest flowers; flowers densely arranged along the short brown pubescent spikelets, caducous, sessile, subtended by very short triangularly ovate bracts which are densely covered on the outer side with a brown tomentum; calyx cupular, 2 mm. long, bearing 5 rounded teeth, strigosely pubescent; petals 5, imbricate, creamy white, 3 to 5 mm. long, nearly equal, united at the base, 2 mm. wide, oblong, obtuse at apex; stamens 10, united at the base and inserted upon the corolla; filaments spreading, glabrous, about 6 mm. long, apex pointed; anthers deep yellow, 1 mm. long, nearly as broad, versatile; ovary stipitate, woolly; style slender, bearing a terminal small capitate stigma, about equalling the stamens.

Type of flowering specimen 9014, *A. D. E. Elmer*, Lucban, near the barrio of Sampaloc, Province of Tayabas, Luzon, May, 1907. Only one tree was observed in humid woods at 500 meters. It is very suggestive of *Adenanthera* from which our flowering specimen can be distinguished by its imbricate petals. Quite near to *C. warburgii Harms*, which however has smaller, alternate, more coriaceous and blunter leaflets.

Cynometra alternifolia n. sp.—Tall trees with splendid boles 6 to 9 dm. in diameter; branchlets grayish white with minute brown lenticels, rigid, quite numerous and forming bushes at the ends of the main branches. Leaves rigid, coriaceous, unequal in size, ovately oblong or subelliptic, 1 to 3-foliate, frequently curved especially toward the apex, glabrous and lucid on both sides, entire, obtuse or acute at apex, obtuse or rounded at base, the blades alternating, 15 cm. long, 7 cm. wide; nerves 9 to 13 on each side, equally visible from both sides, scarcely more prominent than the secondary ones and numerous reticulations; petiole thick, transversely wrinkled, glabrous and more or less glandular, 8 mm. long, easily separating. Infrutescence axillary, rigid, 1 to 3 dm. long, widely but sparingly branched, the branchlets roughened by the numerous scars of the fallen flowers; fruits comparatively few coming to full maturity, quite heavy, lenticular or almond shaped, 2 to 3 cm. long, 1.5 cm. thick, brown, finely scurfy or scaly, obtusely rounded at both ends, subsessile, its sides not extremely thick nor fleshy.

Type specimen 7356, *A. D. E. Elmer*, Palo, Province of Leyte, Leyte, January, 1906.

Pithecolobium williamsii n. sp.—Tree, 5 m. high at least, with medium hard white wood; bark reddish brown, roughened with numerous lighter colored lenticels. Leaves 2 dm. long, chiefly toward the end of branchlets which form rather dense bushes, ascending rachis caniculate or fluted on the upper side toward the apex, with 2 to 3 pairs of pinnae; pinnae also grooved, erect, the terminal pair characteristically recurved, from 10 to 15 cm. long, the basal pair usually smaller; glands conspicuous, in between the base of the pinnae stalks; leaflets 3 to 7 pairs, the terminal pair largest, ascending, dull green but paler beneath, oblong to obovate or frequently subrhomboid, upon very short and thick petioles, acute at both ends or more rounded at apex, the average one 5 cm. long and 2.5 cm. wide, glabrous, subcoriaceous, the brown midrib beneath prominent, nerves and reticulations faint, entire. Inflorescence axillary and subterminal, straight and rigid, erect, about 2 dm. long, the upper flower bearing portion rusty brown; buds ascending, hard; pedicels comparatively thick, similarly colored, 5 mm. long, early falling, leaving large circular scars; calyx rigid, 5 mm. high, cup shaped, 5 mm. across the top, with 5 shallow and broadly rounded teeth, fuligineous brown; corolla 15 mm. long, mostly ascending or only the tip recurved, coriaceous, with a very short light umber colored dense felt like pubescence on the outside, pale white on the inner side, strap like, 3 to 5 mm. wide, obtuse at apex, loosely united from the middle to the base; stamens very numerous, hairlike, subequal, about 3 cm. long, loosely united toward the base, the free portion tangling, also brown, glabrous; anthers brown, 5 mm. long, 0.75 mm. wide, versatilly attached, the valves of the sacs spreading and appearing as hyaline wings after the pollen is shed; ovary 5 mm. long, bristly brown pubescent; style pale white, very slender and glabrous, 4 cm. long; stigma terminal, small, with a whitish rim; pods not seen.

Type specimen 8833, *A. D. E. Elmer*, Baguio, Province of Benguet, Luzon, March, 1907. Only one tree was seen on a ridge of the Sablan cañyon above that barrio. Later I have noticed about one half a dozen trees in precipitous places along the Bued river. The flowers are extremely delicate and rather showy, but owing to their early falling habit there is scarcely ever more than one or two on each stalk. I take pleasure in naming this species after *Mr. R. S. Williams*, collector for the New York Botanical Garden, whom I first met at this station.

Dioclea umbrina n. sp.—A rigid sprawling climbing shrub; young branches sparsely pubescent. Petiole 10 cm. long, articulate, subtended at the base by 1 cm. long stipules with broad bases, 2 cm. extended beyond the first leaflets, woolly pubescent; petiolule 5 cm. long, similary pubescent, also articulate, subtended by 8 mm. long and awl shaped stipules; leaflet 14 cm. long, one half as wide, elliptic or the lower one ovate, acutely pointed, truncately rounded at the base, coriaceous, the upper side strigosely pubescent, more densely covered with umber colored hairs beneath, ascending veins 9 to 11 pairs and prominent as is also the midvein. Infrutescence upon slender terminal or subterminal spikes, the rigid stalk gradually tapering into a small tip, pubescent; flowers not seen, but judging from the persistent 4 mm. long tubercles they are sessily clustered; pods upon 1 cm. long and 5 mm. thick recurved woody stalks, about 15 cm. long, 5 cm. wide, the ventral suture grooved and 5 mm. thick, apex abruptly tapering into a rather sharp point, base obtuse, the sides thick and rigid, strongly compressed between the 3 to 5 beans, densely and permanently clothed with soft 3 mm. long umber colored hairs; bean 2.5 cm. in diameter, nearly 2 cm. thick, lenticularly marble like, shining brown, place of attachment extending three fourths around and marked by a double band of white.

Type specimen 9015, *A. D. E. Elmer*, Palo, Province of Leyte, Leyte, January, 1906. The genus *Dioclea* contains about 18 species, all tropical American except two or three. Ours differs primarily from *D. javanica Benth.* in having pods with long persistent hairs, with the upper suture much narrower, and with smaller but more numerous beans. More recently it was again collected at Baguio, Province of Benguet, Luzon.

Dumbaria merrillii n. sp.—Subscandent vine, forming tangled masses, short cinereous pubescent and with resin colored glands; the younger stems and branches green. Leaf petiole 4 cm. long, extended beyond the first leaves; petiolule 4 mm. long, articulate; leaflets 3, the terminal larger and symmetric, broadly ovate, very variable in size, from 3 to 7 cm. long, about as wide, apex acute, base rounded, canescently white tomentose and glandular beneath, subglabrous above; nerves usually 3 from the base. Inflorescence erect, 8 to 13 cm. long, simple or sparingly branched, slender, often subflexuose, from the axils of the leaves or from the axils of the branchlets, velvety pubescent; pedicels ascending, 1 cm. long; calyx quite thick, 8 mm. long, 6 mm. thick, subglabrous, cup shaped, terminating into 4 broad teeth, the lateral ones a trifle shorter; banner 3 cm. long, 2.5 cm. wide, orbicular or broadly obovate, the 5 mm. long claw provided with 2 recurved spurs at the distal end, yellow with dark purplish streaks, much recurved; wings slightly shorter, the basal one third clawed and spurred, crookedly bent in the vicinity of the spur; lamina oblong, 7 mm. wide, 18 mm. long, similarly colored; keels equalling the wings, the basal 8 mm. long portion slenderly clawed, the lamina proper lunate, obtuse at apex and strongly curved upward, the base free from the claw and similarly shaped, about 1 cm. wide, also yellow and with fine purplish streaks; the 10 stamens united for nearly the entire length, glabrous, 3 cm. long, the free apical portion erect or ascending, quite thick at the base and gradually tapering, brown in the dry state; anthers 1 mm. long, 0.5 mm. wide, with acute ends; ovary flattened, broadly linear, entirely covered with light yellow granules; style exceeding the stamens, slender, pubescent below the middle, terminated by a knob like stigma; fruits not seen.

Type specimen 8502, *A. D. E. Elmer*, Baguio, Province of Benguet, Luzon, March, 1907. In copses of woods of the Bued river below the barrio of Twin Peaks. The Igorrotes call it Kalat. Named after *Mr. E. D. Merrill.*

Caesalpinia benguetensis n. sp.—A rigid sprawling shrub, on limestone cliffs; wood wiry; bark dark brown, beset with stiff short recurved spines and covered with lighter brown colored lenticels; branches quite crooked and gnarly. Leaves alternate, 1 to 2 dm. long, the rachis usually recurved, hooked beneath, covered with a short yellowish brown tomentum, bearing from 5 to 7 pairs of pinnae; these pinnae are mostly ascending, articulate, the basal ones smaller; leaflets paler or yellowish green beneath, broadly oblong or slightly obovate, with a very short articulate stalk, punctate and yellowish pubescent beneath, 15 mm. long or less in the smaller ones, one half that in width, slightly succulent, 7 to 9 pairs. Inflorescence a terminal spicate raceme, erect; buds subtended by yellowish pubescent bracts which fall very early; flowers subpendulous, solitary, upon slender 2 cm. long and ascending pedicels; calyx united at the base into a shallow short tomentose cup, 5-segmented; the 4 lateral ones 6 mm. long, 2 mm. wide, flat, obtuse or rounded; the lower one a trifle longer, ventrally folded, more divergent, all yellowish and minutely pubescent; petals free, 5, spreading, light yellow except the spotted banner whose lower one half is developed into a thick claw while the upper orbicular one half is strongly turned back; lateral petals nearly equal, broadly obovate, abruptly contracted into a short claw at the base, conspicuously nerved, about 15 mm. long, 10 mm. wide; stamens 10, all fertile, subequal, about 15 mm. long; filaments tapering from the base to the apex, flattened, woolly except near the pointed apex which is of a deep red; anthers of the same color, 2 mm. long, oblong, versatile; style and ovary cinereously pubescent, the former equalling the stamens and terminated by a thickened stigma with a finely ciliate rim; pods 10 cm. long, 3 cm. wide, descending, hard, rather compressed, of the same width throughout, equally tapering at both ends, 5 to 7-ovuled, keeled along the ventral suture, nerved especially on the dorsal one half, not flat and straight but usually with a bulge, apex abruptly coming to a short point.

Type specimen 8720, *A. D. E. Elmer*, Baguio, Province of Benguet, Luzon, March, 1907. So far this species has been found in our island only twice, and both times on limestone cliffs between Baguio and La Trinidad. It differs from *C. sepiaria Roxb.* in having smaller leaves, obsolete stipules, and pods not beaked.

Strongylodon zschokkei n. sp.—Scandent shrub; Stems slender, tough, flexible, twining; bark smooth, brown. Petiole 6 to 10 cm. long, glabrous, at the base subtended by papyraceous acuminate bracts 5 mm. long and 3 mm. wide at the base, 1 to 2 cm. extended beyond the first leaflets; petiolule 7 mm. long, rather thick, subtended by dry linear bracts or stipules; leaflets trifoliate, the terminal one symmetrical and oblong to broadly lanceolate, the lateral ones ovate, quite variable in size, the larger ones 17 cm. long, 7 cm. wide, glabrous, subcoriaceous, dark green, the 5 to 7 nerves conspicuous beneath, base rounded or truncate, apex abruptly contracted into an acuminate tip. Inflorescence spicate, pendulous, upon 3 dm. long purplish peduncles or frequently much less; buds erect; calyx thick, lenticelled, dark steel blue, 1 cm. long, 7 mm. in diameter, cup shaped, the membranous rim repandly toothed; flower upon slender straight glabrous pedicels 2 to 3 cm. long, 3 to 5-clustered on very short tubercles arranged only toward the end of the rachis, loosely flowered, deciduous; banner 4 cm. long, the base abruptly contracted into a short claw and with a broad truncate spur, lanceolate oblong, the apex obtuse, 14 mm. across just below the middle, streaked with light purple, strongly reflexed; wings 2.5 cm. long, the lower one half developed into a very slender spur; the lamina oblong, 15 mm. long, one half as wide, apex rounded, base with an obtusely rounded lobe, deeper purple striate; keels falcate, 4 cm. long, about 5 mm. wide just above the middle, the basal portion slenderly tapering into a claw, the apex also slenderly tapering to a fine point, falsely united along the dorsal side and from the apex down to the middle; filaments glabrous or slightly pubescent toward the base, the free ends subequal, with hyaline margins; anthers 1 mm. long, versatile, 0.3 mm. wide, oblong; ovary slenderly stipitate, pubescent; style hyaline margined, about 5 cm. long; stigma small, finely ciliate.

Type specimen 8540, *A. D. E. Elmer*, Baguio, Province of Benguet, Luzon, March, 1907. It is quite frequent in this vicinity but is chiefly confined to the limestone formation. It is distinguished from *S. elmeri Merr.*, by its broader lower leaflets, by its more scattering inflorescent heads, flower not greenish blue but more of an atro-violaceous color and with its parts much larger,—the standard being twice as long. Named after *Mr. Theo. C. Zschokke.*

Derris lianoides n. sp.—Tall tree climbers; stems and branches wiry and flexible; bark brown, covered with lighter colored lenticels. Leaves 2 dm. long, simple pinnate; petiole glabrous, subtended by 4 mm. long ovate bracts; petiolule subglabrous, 5 mm. long articulate; leaflets 3 to 5 pairs, the terminal one somewhat larger, submembranous, light brown when dry, oblong to elliptic, 7 to 9-nerved, base rounded or acute, apex acute to acuminate, 7 cm. long, 4 cm. wide. Inflorescence chiefly along the branches beneath the leaves, similarly subtended by coriaceous subglabrous bracts, 7 to 14 cm. long, usually branched from near the base into 2 to 3 radially spreading spicate racemes, arising from the axils of fallen leaves or from the axils of branchlets, glabrous; main pedicels slender, 1 cm. long, bearing solitary flowers, or giving rise to an umbel of 2 to 3 flowers; secondary pedicels as long as the main ones, slender and divaricately spreading, subtended at the base by minute bracts, frequently half nodding near the apex; flowers scattering, somewhat succulent, whitish with a little pink, deciduous; calyx glabrous, cup shaped, 4 mm. deep, 4 mm. wide across the top, subtended at the base by 2 or 3 very minute bracts, truncate or at least the lower one half only with an evident tooth, saccate, margin on the inside finely ciliate; banner 18 mm. long, about 10 mm. wide, oblong, abruptly contracted at the base into a short claw, apex round, often emarginate; wings 15 mm. long, spurred at the base and the lower one third contracted into a very slender claw, 4 mm. wide near the base, gradually tapering toward the obtuse apex; keels equalling the wings, the lower one third extended into a slender straight claw; the lamina oblong, with a rounded apex, 4 mm. wide above the middle; monodelphous stamens glabrous, the free filaments inflexed and unequal in length; anthers elliptic, 1 mm. long; ovary slender, stipitate, pubescent; style thick, also pubescent, strongly recurved at the apex; stigma capitate, sparsely hairy; fruit not seen.

Type specimen 7443, *A. D. E. Elmer*, Lucban, Province of Tayabas, Luzon, May, 1906. It is found here and there climbing tall trees in the woods at 800 meters on Mount Banahao. The flowers are much visited by Hymenopterous insects. More recently it was found in Mindanao.

Bauhinia whitfordii n. sp.—A liana like shrub, climbing by loops; stems flattened, longitudinally grooved on each side, the size of a man's wrist; wood soft, reddish, watery; old bark checked, that on the branches smooth and yellowish brown. Young twigs and petioles soft densely reddish brown pubescent; petiole 6 to 10 cm. long, ascending, straight; average leaf 15 cm. long and 13 cm. wide, widest above the middle, subcoriaceous, shining above, finely reticulate, similarly pubescent beneath especially along the radiating 9 to 11 nerves and along the rather coarse reticulations, the central nerve protruded into a 3 mm. long pubescent bristle, the base deeply cordate or roundly lobed, the apex widely lobed one third the length, the lobes acute, margins subentire or obscurely undulate and densely ciliate with short reddish brown hairs, slightly folded ventrally. Inflorescence terminal, erect or suberect, raceme spicate or frequently branched from near the base, 1 to 2 cm. long; pedicels 3 to 5 cm. long, slender, usually straight and divaricate, fuliginously pubescent, bracteate; flowers deciduous, yellow when fresh, soon turning to a light brick red; calyx equally pubescent, 8 mm. long, ultimately separated and reflexed into 4 to 5 unequally wide lanceolate to narrowly elliptic segments; petals membranous, 5, radially spreading, finely pubescent on the outer side and densely so on the claw, slenderly clawed, very unequal, the smaller one 12 mm. long and 4 mm. wide, oblong to elliptic, the larger one 12 mm. wide; stamens 3, fertile; filaments thickened and pubescent toward the base, free, 13 mm. long; anther 3.5 mm. long, 2 mm. wide, oblong, versatile, dehiscing longitudinally; ovary ciliate pubescent as is also the thick suberect 5 mm. long style; pod flat, smooth, hard, pendulous, the color of brown leather, 6 mm. wide, 2.3 dm. long, both ends very bluntly obtuse, 9 to 11-seeded, bursting and forming twisted rolls; the beans nearly circular except the pointed place of attachment, about 2 cm. in diameter, 2 mm. thick, very flat, hard, brown, smooth around the margin, crinkled on the central portion of the sides.

Type specimen 8897, *A. D. E. Elmer*, Baguio, Province of Benguet, Luzon, March, 1907. It was found only in a few places along the river just above the barrio of Sablan. It is nearest related to *B. cumingiana F. Vil.* but with larger flowers and larger leaves whose nerves beneath are densely pubescent. Named after *Dr. H. N. Whitford*.

Mucuna curranii n. sp.—A liana like climbing shrub or widely sprawling over limestone cliffs; stems and main branches flexible but tough. Leaf petiole 5 mm. long, slender, glabrous, much thickened and usually twisted at the base, extended about 2 cm. above the first leaflets; interaxillary bracts subglabrous, acuminate, 3 mm. long; petiolule 3 mm. long, articulate, subtended by 3 mm. long bristle like stipules; leaflets 3, the terminal one symmetrical, about 10 cm. long, 3.5 cm. wide, broadly lanceolate, apex acuminate, base rounded, glabrous above, strigose pubescent beneath with 3 to 5 pairs of ascending nerves, submembranous; the lateral leaflets very inequilateral, more or less ovate, the upper one half straighter and smaller. Inflorescence upon very slender glabrous axillary peduncles which vary greatly in length, hanging; the terminal flower bearing portion thickened, paniculately branched, covered with a dark brown pubescence; pedicels equally pubescent, 1 to 2 cm. long, straight, quite thick, articulate; bud bracts oblong, usually split in two, 16 mm. long, acute, with yellowish adpressed hairs on both sides, caducous; calyx persistent, saccate, 2.5 cm. long, 2 cm. wide, with shining brown hairs on the outside but which have no stinging qualities, 4-toothed, the upper one very broad, the 2 latteral ones longer, the lower one longest; banner light cream color, 5 cm. long, elliptic, 3.5 cm. wide, at the base abruptly contracted into a 7 mm. long claw, the lamina strongly reflexed; wings 6.5 cm. long, at least 15 mm. wide, nearly straight, terminated into an abruptly obtuse apex, oblong, contracted toward the base and projected into a spur, claw 1 cm. long and with margins ciliate; keels 7 cm. long, obtuse, with a very blunt tip, strap like, 1 cm. wide just below the upwardly curved apical portion, gradually attenuate clear to the base; monodelphous stamens straight, glabrous, equalling the keels but protruding above them, the free suberect filaments flattened and subclavate toward the apex but ultimately abruptly pointed; anthers 4 mm. long, narrowly oblong, basifixed, the slightly smaller ones bearded at the base; ovary and style slender, brown pubescent; pods 18 cm. long or much less, 4 cm. wide, 5 to 7-seeded, tip slenderly acuminate and strongly recurved, sides rather thin and prominently obliquely ridged or winged, the dorsal and ventral sutures bounded by wider wings, with a sparse soft bristle like pubescence; beans, flat, hard, nearly circular, 16 mm. in diameter, 7.5 mm. thick, dull black.

Type specimen 8442, *A. D. E. Elmer*, Baguio, Province of Benguet, Luzon, March, 1907. This very distinct alpine species occurs in great profusion in ravines of limestone outcroppings about Baguio and in the mountainous sections both north and south of the summer capitol. It is not to be confused with the subalpine species *M. longipedunculata Merr.* which is quite common and is the only liana like *Mucuna* in the vicinity of Sablan, its type locality. The pod of the former species is much flattened, with thin wing like oblique ridges, comparatively thin and light; that of the latter is almost cylindric, without ridges, very thick and rigid, and with shallow irregular constrictions between the beans. Named after *Mr. H. M. Curran*, who also collected it at Baguio.

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Vol. I. November 6, 1907. Art. 13.

LEAFLETS
OF
PHILIPPINE BOTANY

SOME NEW AND CRITICAL FERNS

BY

E. B. COPELAND

SUBSCRIPTION PRICE 2 CENTS PER PAGE

MANILA, P. I.

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11.	Freycinetia from Lucban	A. D. E. Elmer.
12.	Some New Leguminosae	A. D. E. Elmer.

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EDITED BY A. D. E. ELMER, A. M.

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E. B. COPELAND.

(*Bureau of Education, Manila, P. I.*)

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Dennstaedia elmeri Copel. n. sp. Rhizomate fide *Elmer* fere 2 cm. crasso, ad terram repente, nigro aculeato, frondibus inter se 25 cm. distantibus; stipite fide *Elmer* usque ad 2 m. alto, aculeato; fronde, stipite incluso, 3-5 m. alta, tripinnata, rhadibus brevi-aculeatis badiis; pinnis oppositis, ad rhachin ut videtur articulatis articulatione cincta, 50-65 cm. longis, 20-25 cm. latis, late lanceolatis, acuminatis, rhachidibus infra aculeolatis; pinnulis I pseudo-articulatis, sessilibus, infimis exceptis alternantibus, valde acuminatis, rhachidibus puberulis; pinnulis II sessilibus, auriculatis, obtusis, maximis 15 mm. longis, 7 mm. latis, subcoriaceis-venis primariis infra puberulis, aliter glabris, ultra mediam laminam incisis; soris pinnulae II quaque usque ad 7, in fundis sinuum, 0.6-1 mm. latis, inflexis.

Mt. Banajao, Luzon, 750 m. s. m. *Elmer* 8027; Mt. Maquiling, *Matthew S. N.*, small specimens. I have no specimen of *D. moluccana* (*Bl.*) *Moore*, supposed to occur in Celebes and Formosa but this species differs in many ways from *Blume's* diagnosis (Enumeratis, 1828 p. 239). The nearest relative in our flora is the comparatively small and simple *D. erythrorachis*, which has brown instead of dark maroon axes, and rhachises without spines.

Tectaria decurrens (Presl) Copel. *Aspidium Presl* Rel. Haenk. I (1825); 28. *A. heterodon Copel.* in *Perkin's* Fragmenta I (1905); 177. *A. copelandi C. Chr.* Index (1906); 661. I now regard this as one of our most variable ferns and include in it forms with the rhizome horizontal, ascending and erect, and with the margin of the upper part of the frond varying from almost entire to very deeply and irregularly cut. It is no less variable in size. *Elmer's* No. 7932 has the segments 40 cm. long and 7.5 cm. broad, with some of the sori 3 mm. in diameter. *Presl* states in the original description that the frond is completely pinnate at the base, and *Merrill* has collected such a fern in Mindoro (P. J. S. 2 C. (1907); 123.

Cyclophorus achrostichoides (Forster) Presl var. gracilis Copel. n. var. Typo speciei partibus omnibus gracilioribus, fronde 30-50 cm. longa, vix 1 cm. lata, minus coriacea, sororum seriebus 3-4, pedicellis stipitum brevioribus differt.

Ad montem Banajao Insulae Luzon. *Elmer* 7751 and 7867.

So distinct in appearance from the ordinary *C. achrostichoides* that I did not at first suspect their affinity.

Trichomanes bauerianum Endl. Mt. Banajao, *Elmer* 8109. This agrees perfectly with specimens from Java, New Guinea and Hawaii; the species has not been found before in the Philippines. *T. apiifolium Presl* is very distinct.

Stenochlaena laurifolia Presl. Mt. Banajao, *Elmer* 7756. *Prof. Underwood* * distinguishes his *S. milnei* by its having wider sterile pinnae with rounded bases and narrower sporophylls. Much of *Elmer's* material has the sterile pinnae 3.5 cm. or more in width; in the key to the species (l. c. p. 37) those of *S. milnei* are given as 3.5-4 cm., but this loses 0.5 cm. in the diagnosis. Some pinnae of *Elmer's* plant are truncate, others rather rounded. The larger fertile pinnae are 10 mm. broad. A Mindoro plant, Bureau of Science, No. 1545, with sterile pinnae at most 3 cm. wide, has the fertile ones 5-8 mm. wide and 20-25 cm. long. As the bases are rounded rather than truncate, it is nearer *S. milnei* by the diagnosis; but it certainly cannot be separated from *S. laurifolia.*

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* The Genus *Stenochlaena*. Bull. Torr. Bot. Club. 33 (1906); 35.

Elaphoglossum luzonicum Copel. n. sp. Rhizomate valido, 5 mm. crasso, dense investo; stipitibus confertis 2 mm. crassis deosum paullo incrassatis nec usquam articulatis, paleis pallidis diversis, majoribus anguste ovatis acutis 7 mm. longis vestitis, 16-30 cm. altis, fertilibus plerumque quam sterilibus longioribus; fronde sterile 20-25 cm. alta, 4-5.5 cm. lata obtusa, basi acuta, margine cartilaginea angusta acuta, squamulis submarginalibus deciduis subciliata, aliter max glabrescente et glaberrima; venulis secoper visibilibus et in vetustate conspicuis inter costam et marginem liberis; fronde fertile minore, aliter vix diversa.

Mt. Banajao, 1200 m. s. m., ad truncos muscosos. *Elmer* 8190; Mt. Mariveles, 1300 m. s. m. *Merrill* 3250.

A species of the *E. conforme* group, differing from *S. cumingii* (*Tec.*) *Moore*, as described, in being less coriaceous, having evident veins, and in being early and completely glabrescent, except for the more persistent intramarginal squmulae. Our *E. conforme* is a small fern with more acute fronds and more or less articulate stipes.

Dryopteris dubia Copel. n. sp. Rhizomate ut vidatur adscendente, ca 4 mm. crasso, basibusque stipitum paleis lanceolatis castaneis 3 mm. longis vestitis, stipitibus confertis 10-20 cm. altis, vinoso-castaneis sursum rhachidibusque pilis minutis paleisque parvis distantibus pubecentibus; fronde lanceolato-deltoideis, usque ad 50 cm. alta, 20 cm. lata, acuminata, quadripinnatifida; pinnis oppositis vel superioribus alternantibus, acuminatis, infimis deltoideis, 12 cm. longis, 10 cm. latis; pinnulis ultimis lanceolatis, fere ad costam in segmentis plerumque integris obtusis late oblanceolatis divisis, membranaceis, subglabris; venulis simplicibus; soris terminalibus; indusii forma variabilissima, saepius athyrioidea, interdum dryopteroides sinn lato vel subclauso, rarius asplenioides.

Mt. Banajao, 850 m. s. m. *Elmer* 8083. Judging by the sori this fern would be an *Athyrium;* but the frond's form and the color and texture of the indusium and annulus mark it as a relative of *Dryopteris rhodolepis* (*Clarke*) *C. Chr.*

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A FASCICLE OF TAYABAS FIGS

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LEAFLETS OF PHILIPPINE BOTANY

EDITED BY A. D. E. ELMER, A. M.

Vol. I. Manila, P. I., November 15, 1907. Art. 14.

A FASCICLE OF TAYABAS FIGS

BY

A. D. E. ELMER.

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With three exceptions, the following forty one species and varieties of *Ficus* were collected within a radius of three miles of Lucban, Province of Tayabas, Luzon. This town has an approximate altitude of 500 meters. It is situated about two miles from the base of Mount Banahao on the north east side of the lesser peak. There is a good carromata road from the town of Tayabas to Lucban, a distance of about eight miles; also an old abandoned roadway leading around near the base of the mountain. The good road continues eastwardly to Majaijai and on down to Santa Cruz, Province of Laguna. That portion between Lucban and Majaijai is no longer than five miles but is almost impassible for pack animals. The road leading out of Lucban to the north soon forks. The left branch goes to Pagsanhan (by way of Louisiana and Cavinte), and is said to be eighteen miles long. The greater portion of this road is passible for vehicles and is much used at the present by pack trains. The right branch leads to Mauban on the Pacific coast, a distance of fifteen miles.

The country about Lucban is chiefly composed of hillocks covered with turf grasses and bordered with shrubs. The Batocan River heads in one of the largest ravines on the north side of the mountain, circles around the town and finally flows westerly into the Dalitiwan River. The beautiful Botocan Falls is in the Batocan River a few miles above the junction of the two rivers and on the trail from Majaijai to Louisiana. In the flats along this river and in the terraces upon the hillsides, rice is extensively cultivated. Water supply for irrigation purposes is not lacking. Dikes are dug for the purpose of leading the water from the upper ravines over the low hills and upon the inclines. The town itself is supplied with clear running water from the mountain.

There is a gradual incline of about two miles from Lucban to the timber line at the base of the mountain. Here the ascent is quite abrupt and steep for about one third the distance to the summit. Beyond this it is gradual. The vegetation between Lucban and the foot of the mountain is chiefly composed of grassy glens surrounded and interspersed with shrubberies on the higher inclines, while that along the creeks of the deeper ravines is mixed with trees and shrubs and abounds with tall, slender, swaying bamboos. These ravines deepen into gorges which become narrower and are occasionally intercepted by precipices.

The splendid coconut palm groves that extend up from Santa Cruz as far as Nangcarlan and Cavinte are broken up into fragmentary patches which are confined in our district only to sheltered nooks. Several miles to the west of Lucban is the Dalitiwan River which also heads on Mount Banahao (the higher peak), flows near the town of Majaijai and northerly into the Laguna Bay. In this broad valley the coconuts extend continuously nearly up to the timber line of the mountain. Several miles to the north of Lucban the Mahapon River rises, flows easterly into the Pacific Ocean. In the upper half of this narrow valley the small barrio of Sampaloc is located. This place is said to be about seven miles from Lucban and has an altitude at least 350 meters less than the surrounding country of Lucban. It was at these two towns that *Dr. Otto Warburg* stopped for collecting in his itinerary through Luzon in March and April of 1888.

The figs inhabiting the thickets about Lucban are chiefly shrubs or small trees, common, and more or less widely distributed in the Philippines. They are *F. pisifera Wall.*, *F. indica Linn.* and its variety, *F. hauili Blco.*, *F. ben-*

guetense Merr. and its variety, *F. quercifolia (Roxb.) King*, *F. nota (Blco.) Merr.*, *F. pseudopalma Blco.*, *F. odorata (Blco.) Merr.* and *F. caudatifolia Warb.* The last named species is most abundant in this region but evidently not so common elsewhere in the Archipelago. The next to the last species was found only in the town of Lucban. In the woods at the base of Mount Banahao are the following tree species; *F. caulocarpa Miq.*, *F. ruficaulis Merr.*, *F. latsoni Elm.*, *F. minahassae Miq.*, *F. integrifolia Elm.*, *F. barnesii Merr.*, *F. glomerata Roxb.*, *F. linearifolia Elm.*, *F. magnifica Elm.*, *F. similis Merr.*, *F. longipedunculata (Merr.) Elm.*, *F. palawanense Merr.*, *F. malunuensis Warb.* In this region only two scandent shrubs were observed, namely, *F. apiocarpa Miq.* and *F. tayabensis Elm.* Of the former only one plant was discovered at the beginning of my collecting season in 1906. The latter species is equally rare and was found only at the close of the collecting season of 1907. In the ravines and on the ridges of the base of Mount Banahao or rather on the basal one third of the mountain are the following scandent species, none of which was common; *F. propinqua Merr.*, *F. megacarpa Merr.* and *F. warburgii Elm.* Of erect or sprawling shrubs are *F. fastigiata Elm.*, which was collected only once on a rocky exposure, *F. angustissima Merr.*, *F. confusa Elm.*, *F. guyeri Elm.* and *F. lucbanensis Elm.* The last named species is the most common in this belt. The following two small tree species also belong here *F. repandifolia Elm.*, and *F. banahaensis Elm.* The former was more common in the humid woods between Lucban and Sampaloc than elsewhere in this district. *F. anomala Merr.* was only once met in open woods bordering rice fields towards the Batocan Falls. In this same vicinity and near rapids of the Batocan River *F. inequifolia Elm.* was discovered. *F. manilensis Warb.*, *F. gigantifolia Merr.* and *F. sinuosa Miq.* were cellected in the vicinity of Sampaloc and are the only species collected outside the three mile radius of Lucban.

SYNOPSIS OF THE SECTIONS.

Group I.—Pseudo-hermaphrodite; male flowers with 1 stamen and a rudimentary pistil. Pseudo-hermaphrodite flowers and gall flowers in one set of receptacles; fertile female flowers in another set.

I. PALAEOMORPHE.

Group II.—Unisexual or asexual; male flowers without rudimentary pistils.

Section I.—Male, gall, and fertile female flowers on the same receptacle.

II. UROSTIGMA.

Section II. —Flowers unisexual or neuter; male and gall flowers on one set of receptacles, fertile female and neuter flowers in another set.

III. SYNOECIA.

Section III.—Flowers unisexual; male and gall flowers in one set of receptacles, fertile female flowers only in another set.

A.—Flowers monandrous.

a.—Receptacles chiefly axillary.

IV. SYCIDIUM.

b.—Receptacles mostly in fascicles from stem and branches.

V. COVELLIA.

B.—Flowers di rarely triandrous.

a.—Receptacles mostly axillary.

VI. EUSYCE.

b.—Receptacles mostly in fascicles from stem and branches.

VII. NEOMORPHE.

I. PALAEOMORPHE.

1. **F. pisifera Wall.** Cat. 4504.

Specimens 9371, 7517, 7427 and 7698, *A. D. E. Elmer*, Lucban, Province of Tayabas, Luzon, May, 1906 and 1907. Quite common along streams in woodlands at 700 meters around the base of Mount Banahao.

2. **F. fastigiata Elm.** Leaf. Philip. Bot. 1: 44, 1906.

Represented by 7841, *A. D. E. Elmer*, Lucban, Province of Tayabas, Luzon, May, 1907. It usually inhabits rocky ridges or outcroppings of alpine districts of Luzon. *F. validicaudata Merr.* is very near this species, but 967, *H. N. Whitford*, from Mount Banahao, Province of Tayabas, Luzon, is *F. guyeri Elm.*

3. **F. confusa Elm.** Leaf. Philip Bot. **1**; 47, 1906.

Specimens 7425 and 7936, *A. D. E. Elmer*, Lucban, Province of Tayabas, Luzon, May, 1906 and 1907. Usually along water courses of light woods of the foothills at 800 meters and in thickets bordering rice fields at 200 meters lower down. Number 7936 was collected in the former place and has thinner slenderly caudate leaves.

4. **F. caudatifolia Warb.** in *Perkin's* Phrag. Fl. Philip. 194, 1905. *F. eucaudata Elm.* (in part) Leaf. Philip. Bot. 1; 46, 1906.—Shrub, 3 to 8 m. high, its branches widely ramifying, slender, wiry, glabrous, smooth, gray or yellowish gray, the terminal young portion chocolate brown; wood soft, white. Leaves chartaceous, horizontally spreading, flat or slightly conduplicate on the upper surface and with recurved tips, scattered along the twigs, dark lucid green above, duller and lighter green beneath, glabrous, the caudate apex 2 to 3 cm. long, base obtuse or subcuneate, the medium blade 16 cm. long and 5 cm. across the middle, edges mostly entire or frequently obscurely undulate, the larger ones ovately lanceolate to oblong, the smaller blades subelliptic; petiole 3 to 5 mm. long, comparatively thick, scurfy brown; bud scales triangularly acuminate, 3 mm. long, of a similar color, sometimes puberulent; straw colored veins very prominent beneath, the basal pair closely following the margin clear to the caudate point and connecting with the 3 or 4 lateral pairs, reticulations also prominent.

Receptacles globose, solitary or several from the leaf axils or axils of fallen leaves, upon 1 to 1.5 cm. long recurved scabrous peduncles, 1 cm. in diameter, harsh, yellowish red, with milky white lenticels, ultimately becoming smooth, soft and dark red; umbilicus only slightly raised; number 7516 apparently only with fertile female flowers; pedicel thick, spongy;

nearly 2 mm. in length, usually curved at the base; its perianth segments at least 2.5 mm. long, hyaline, strap like, 3-segmented above the middle but ultimately separating clear down to the base; ovary ovately cylindric and somewhat compressed, 2 mm. long, the base abruptly short stipitate, both ends rounded, 1 mm. thick below the middle, smooth, yellowish brown; style subterminal, 0.75 mm. long, slender, bearing a dark brown obliquely clavate stigma.

Specimens 7516, 7452, 7454, 7510, 7655, 9381 and 9380, *A. D. E. Elmer*, Lucban, Province of Tayabas, Luzon, May, 1906 and 1907; also 8325, *A. D. E. Elmer*, Los Baños, Province of Laguna, April, 1906, which was distributed as *F. eucaudata Elm.* It is very common in thickets bordering meadows and in dry gulches, and is related to the seacoast southern species *F. mindanaensis Warb.* which has much larger underneath pubescent leaves; again, it is equally closely related to *F. eucaudata Elm.*, a smaller leaved species inhabiting the higher mountains of middle northern Luzon. My number 8023 from Twin Peaks, Province of Benguet, Luzon, I now regard as *F. caudatifolia Warb.*

5. **F. anomala Merr.** in Philip. Journ. Sci. 1. Suppl. 3; 183, 1906.--Erect tree, 15 m. high, with a 5 dm. thick trunk; branches above the middle, divaricate and spreading, the branchlets quite short, rigid and gnarly; bark thinly checked, mottled, covering the yellowish white and more or less brittle wood, that on the young twigs shining brown. Leaves very harsh on both sides, usually conduplicate on the upper surface, exceedingly unequal in size, deep green and sublucid above, lighter beneath, the medium sized blades 17 cm. long, 10 cm. wide across the middle or just below that, papyraceous, ovate to subelliptic, subentire or crenately denticulate, apex very short obtuse or nearly rounded to acute, base broadly rounded or shallowly cordate; lateral veins 5 to 7 or even 9 on each side, their tips interarching, the basal pair much ascending and with lateral veinlets from its lower side, all prominent beneath, cross bars less prominent; petiole 2 to 5 cm. long, equally scabrous; bud scales scaberulous, narrowly acuminate, 6 mm. long.

Receptacles clustered upon short woody tubercles along the stem and larger branches, upon 2.5 cm. long ebracteolate subscabrous peduncles, compressed globose, 1 to 2 cm. in diameter, scabrous when green and immature, turning orange red and ultimately becoming soft, smooth and dark blood red; fertile female flowers 3 mm. long, the perianth ultimately divided into about 5 ligulate or narrowly oblanceolate segments; ovary lenticular, 1 mm. long, smooth, hard, brown, its edges hyaline keeled which extends into a 1 to 2 mm. long pedicel; style sublateral, oblique, strict, 1 mm. long, hyaline but with brown tips.

Represented by 8274, *A. D. E. Elmer*, Lucban, Province of Tayabas, Luzon, May, 1907. In light woods bordering rice fields about three miles west of Lucban toward the Batocan Falls. Only one tree was observed, and aside from the type specimen which was collected at Montalban, Province of Rizal, Luzon, this species is also known from Mindoro.

6. **F. inequifolia n. sp.**—Stout tree, 15 m. high, with trunk 6 dm. in diameter; wood white, covered with yellowish bark roughened with rather large brown lenticels; main branches widely spreading from the middle, ultimate branchlets quite numerous and forming half drooping bushes. Leaves exceedingly unequal in size, subdeflexed, lucid green above, much lighter beneath, conduplicate on the upper side, subpapyraceous, both ends nearly equally rounded, oblong to subelliptic, the rounded apex abruptly long acuminate, the base obtusely rounded or with a short extenuating base, the larger blades 18 cm. long by 8 cm. wide across the middle, glabrous, dark green above, paler green beneath, margins entire; petiole 1 cm. long, thickened, caniculate along the upper side, glabrous; veins prominent beneath, also visible from above, 5 to 7 or even 9 on each side, ascendingly curved above the middle and their tips united, the basal pair much ascending and parallel with the margin, occasionally with secondary nerves, reticulations fine and obscure; bud scales 1 to 2 cm. long, rigid, glabrous, green, acuminate.

Receptacles 1 to 3-clustered in the leaf axils or in the axils of the leaf scars, globose, greenish yellow, about 7 mm. in diameter, spotted with brown lenticels, the base abruptly contracted into a very slender 3 mm. long stalk which at the base is usually subtended by minute bracts; flowers pseudo-hermophrodite and gall only; the former rather few and confined beneath the umbilical scales, upon a 0.5 mm. thick pedicel, subtended by 3 narrow rather irregularly shaped 2 mm. long perianth segments; the pistil short stipitate at the base, smooth, straw color, obovoid, with a short, dark brown, infundibular, subterminal style; anther upon a thick similarly brown colored filament, 0.5 mm. long, basifixed, cordate, triangularly ovate, about 0.75 mm. long; gall flowers upon a 1 mm. long pedicel; its perianth light straw color and finely woolly, 1.5 mm. long, narrow, rather soft in texture; insect ovary glazed, somewhat compressed, elliptic or obovate from a side view, 1 mm. long; its style nearly terminal, 0.5 mm. long, with a dark brown slightly thickened apex.

Type specimen 9362, *A. D. E. Elmer*, Lucban, Province of Tayabas, Luzon, May, 1907. Only two or three trees were noticed near rapids of the Batocan River towards the Batocan Falls. It somewhat resembles *F. subulata Blm.* which is reported by *King* to occur in the Philippines. Herbarium specimens are strikingly similar to *F. confusa Elm.* which is always a straggling shrub.

II. UROSTIGMA.

7. **F. indica Linn.** Sp. Pl. ed. 2; pt. 2, 1514 (in part) 1762-3.

Specimens 7529 and 7708, *A. D. E. Elmer*, Lucban, Province of Tayabas, Luzon, May, 1906 and 1907 respectively.

8. **F. indica gelderi (Miq.) King** in Ann. Roy. Bot. Gard. Calc. 1; 39, 1887. *F. gelderi Miq.* in Ann. Mus. Lugd. Bat. 3; 216 and 287, 1863-9.

Represented by 7723 and 8022, *A. D. E. Elmer,* Province of Tayabas, Luzon, May, 1907. This variety has larger elongated fruits than the more typical forms.

9. **F. similis Merr.** in Philip. Journ. Sci. 1, Suppl. 1; 47, 1906.

Specimen 7716, *A. D. E. Elmer,* Lucban, Province of Tayabas, Luzon, May, 1907. Type specimen, Forestry Bureau number 3013, collected by *Mr. R. Meyer* along the Lamao River, Mount Mariveles, Province of Bataan, Luzon. *Sr. S. Garcia* collected several specimens of it in 1902 at Baler, Province of Principe, Luzon. *Dr. H. Hallier* secured it also from San Ramon, Province of Zamboanga, Mindanao, in 1904.

10. **F. longipedunculata (Merr.) Elm.** Leaf. Philip. Bot. 1; 50, 1906. *F. chrysolepis longipedunculata Merr.* in Govt. Lab. Publ. 29; 11, 1905.

Specimens 9365 and 7739, *A. D. E. Elmer*, Lucban, Province of Tayabas, Luzon, May, 1907. Large spreading trees in woodlands at 700 meters. So far it has previously only been collected in subalpine regions of Benguet and Bataan provinces of Luzon.

11. **F. caulocarpa Miq.** *Urostigma caulocarpum Miq.* in Lond. Journ. Bot. 6; 568, 1848. *F. caulocarpa Miq.* in Ann. Mus. Lugd. Bat. 3; 235 and 297, 1863-9.—Small tree, 6 m. high, with white soft wood; bark smooth, grayish white, when old checked, dotted with transverse lenticels; ultimate branches rigid, crookedly rebranched, but not numerous. Leaves always clustered toward the ends of the twigs, ascending, shining, smooth, coriaceous, strongly conduplicate on the upper side and with recurved tips, oblong, equally rounded at both ends, at the apex abruptly terminated into a stout point, margins entire, the average blade 12 cm. long and 5 cm. wide across the middle; petioles glabrous, stout, 3 to 6 cm. long, strict, green except the thickened brown basal portion; nerves 7 to 9 pairs, straight, more conspicuous beneath, oblique, the basal pair much ascending, faintly interarching 3 mm. from the margin, reticulations obscure, the midnerve stout and very prominent beneath; bud scales triangularly acuminate, 1 cm. long; stipules caducous, very numerous when leaves are young, unequal, the larger ones 1 dm. long and 1.5 cm. wide, linear, soft, very membranous, ferruginous brown.

Receptacles in small clusters along the branchlets or occasionally in the lower leaf axils, glabrous, globose or obscurely obovoid and with a conspicuous dark brown umbilicus, pale creamy white when mature, less than 5 mm. in diameter, becoming granular when dry, upon a glabrous brown 3 mm. long peduncle; bracts brown, glabrous, persistent, spreading, the obtuse segments 1 mm. long, edges thin.

Represented by 9363, *A. D. E. Elmer*, Lucban, Province of Tayabas, Luzon, May, 1907. In our locality it is rare but it is most abundant in the Province of Bataan, Luzon. There is one specimen on hand from the Island of Dinagat collected by *Sr. J. F. Quadras*. The abundance of stipules associated with the young developing foliage presents a most striking appearance.

12. **F. palawanense Merr.** in Govt. Lab. Publ. 29; 11, 1905.—An erect tree, 18 m. high, with a widely spreading crown; main branches from below the middle; the ultimate ones comparatively short, very rigid, 1 cm. thick; bark rough, mottled, that on the twigs gray and smoothish, covering the moderately hard wood. Leaves chiefly toward the ends of the branchlets, thick and very rigid, ovately to obovately oblong to subrotund or subelliptic, the blades 16 cm. long, 8 cm. wide, base obtusely rounded, apex rounded and abruptly tapering to an obtuse or acute point, margins entire, glabrous; midrib very prominent beneath, caniculate above; lateral veins 7 to 9 on each side, oblique, the basal pair much ascending, submarginally united, reticulations faint; petiole 3 to 5 cm. long, glabrous, thick, after falling leaving prominent scars; bud scales rigid, 1.5 mm. long, triangular, the inner surface and the marginal dorsal sides glabrous, otherwise densely gray pubescent.

Receptacles sessile, normally in pairs of the leaf axils or in their scars, shining, purple red and minutely spotted with yellowish lenticels, hard, after falling becoming soft, ellipsoid or frequently obscurely triangular, 1.5 cm. in diameter, 2 cm. long, the umbilicus rounded and covered by 3 very thick scales, subtended by 3, smooth, rigid, yellowish green bracts about 8 mm. long.

Specimens 7460 and 9370, *A. D. E. Elmer*, Lucban, Province of Tayabas, Luzon, May, 1906 and 1907 respectively. In light woods bordering the meadows toward the town of Tayabas along the old abandoned roadway. The type was collected on the Island of Paragua, where it seems to be rather common. It is also sent in from the Baco River, Mindoro. From Luzon it is only known to occur in our locality. Just recently apparently the same species was collected in northeastern Mindanao.

13. **F. malunuensis Warb.** in *Perkin's* Frag. Fl. Philip. 196, 1905.—A round topped and widely spreading tree, 15 m. high, with white moderately hard wood; bark thick, yellowish gray or mottled; ultimate branches crooked, rather thick and gnarly, the younger apical portion pubescent but soon becoming subglabrous. Leaves coriaceous, rotately spreading from the ends of the twigs, dark lucid green above, paler beneath, a trifle conduplicate on the upper side, glabrous, margins entire or obscurely wavy toward the short bluntly acute apex, base rounded or with a very short subauriculately obtuse point or subcuneate in the smaller ones, the average blade 14 cm. long and one half as wide across the middle; nerves prominent beneath, visible from the upper surface also, lateral nerves 5 to 7 on each side, the ends interarching, reticulations very faint; petiole stout, glabrous, 2 to 3 cm. long, nearly 4 mm. thick, early falling, leaving large more or less raised scars; stipules 3 to 5 cm. long, papyraceous, brown, slenderly tapering from the base, glabrous; bud scales 1 cm. long, chartaceous, becoming glabrous.

Receptacles ascending, in the upper leaf axils, solitary or in pairs, subglobose, but usually a trifle thicker above the middle, 2 to 3 cm. in diameter, yellowish green with numerous whitish spots, umbilicus small, more or less yellowish brown pubescent; peduncles 3 cm. long, stout, soft brown pubescent, subpersistent, the distal end bearing 3 bracts; the segments triangularly acute, densely pubescent, rigid, united at the base, about 5 mm. long; staminate flowers scattered above the middle of the syconium, about 4 mm. long; pedicel 2.5 mm. long, rather thick and dark brown, the basal one half surrounded by a glabrous brown membranous sheath which usually terminates into 2 acuminate segments; the true perianth similar in texture and color, 1.5 mm. long, subgamophyllus, enclosing the single stamen, ultimately separated into 2 to 3 very unequal segments; filament maroon brown, 0.5 mm. long; anther about as long, subelliptic, ends roundly truncate; pistillate flowers upon a short pedicel surrounded by similar united bracts; ovary sessile, ellipsoid, 1.2 mm. long, 0.75 mm. thick, inserted upon a thick dark brown lateral and basal caruncle;

style slenderly tapering toward the usually pendulous apex, 3 to 4 mm. long, characteristically curved, arising from the apex of the caruncle; true perianth 3 to 4 mm. long, membranous, gamophyllus, terminated by 2 to 3 fine lacinae.

Specimen 9375, *A. D. E. Elmer*, Lucban, Province of Tayabas, Luzon, May, 1907. In light woods in a valley between Lucban and Tayabas along the old abandoned roadway. It belongs to the *F. chrysolepis Miq.* group and was associated with its nearest alley, *F. longipedunculata (Merr.) Elm.* In the field it is easily recognized from the latter by its shorter pubescent peduncles, bracts and receptacles. The figs are also more confined to the ends of the twigs, e. i., in the upper leaf axils. *Dr. Otto Warburg* collected his *F. malunuensis* at Malunu, Province of Isabela, Luzon, and it differs from my specimen in having shorter and pubescent stipules, shorter petioles and only one half as long peduncles; and leaves never larger than 16 cm. long by 8 cm. wide.

14. **F. warburgii n. sp.**—Scandent, 8 m. high upon trees, numerously branched and forming tangled bushes toward the top; stems 2.5 cm. in diameter, its wood soft and porous; bark of the rigid wiry branches light gray, with only a few lenticels, the younger portion brown and subglabrous or with a sparse brown pubescence. Leaves chartaceous, quite rigid, flat, chiefly at the ends of the branchlets, oblong to subelliptic or obovate, apex rounded, with a short broad subemarginate point, edges subentire, lucid dark green above, lighter beneath and conspicuously yellowish green spotted or tassellate, glabrous, base subcuneate or obtusely rounded, about 5 cm. long, 2.5 cm. across the widest portion; nerves prominent beneath, 5 to 7 on each side, the basal pair faint and much ascending or nearly parallel with the margin, the other obliquely straight, submarginally united, brown and shining, reticulations faint and minute; petiole 5 to 10 mm. long, brown, rather thick and frequently scurfy; bud scale dark brown, glabrous, 6 mm. long, sharply acuminate, convolute.

Receptacles ascending, usually in pairs from the leaf axils or from the axils of fallen leaves, smooth, dark green and hard when collected, with minute lighter colored spots, or frequently the figs are numerously clustered upon short leafless branchlets, subglobose, less than 1 cm. in diameter, the umbilicus only slightly raised, the base abruptly constricted into a slender 5 mm. long stalk; peduncles 3 mm. long, terminated by 5 triangularly acute bracts; flowers male, fertile female, and gall in the same receptacle; staminate flowers monandrous, rather numerous beneath the umbilical scales, a few scattered throughout the inner surface of the syconium, 3 mm. long, glabrous, upon a 0.75 mm. long pedicel; its perianth segments free and subpersistent, narrowly acuminate, about 2 mm. long, usually only 3, brown, glabrous; filaments maroon colored, fleshy, 0.5 mm. long, easily detached; anther 1 mm. long, 0.75 mm. wide, with truncate ends, rigidly inserted upon the thick connective, doughy white; the gall flowers upon 1 mm. long stalks, surrounded by 3 narrow submembranous segments which are united around the stalk but very easily separating from it and becoming detached from the syconium; its ovary invested with a thin brown membrane, obovoidly ellipsoid, 1.24 mm. long; style subterminal, slender, erect, bearing a minute stigma, less than 0.5 mm. long; fertile female flowers very similar, much more numerous and surrounded by similar perianths.

Type specimen 9376, *A. D. E. Elmer*, Lucban, Province of Tayabas, Luzon, May, 1907. This rare species was encountered only once on a dry ridge climbing a half dead tree on Mount Banahao at 900 meters. Named in honor of *Dr. Otto Warburg* who collected and described a number of our Philippine *Ficus*. In some particulars it agrees with *F. pisocarpa Blm.* but in others not at all. Again, it has some affinities to *F. bataanense Merr.*

III. SYNOECIA.

15. **F. megacarpa Merr.** in Govt. Lab. Publ. 17; 14, 1904.

Specimens 7471 and 7827, *A. D. E. Elmer*, Lucban, Province of Tayabas, Luzon, May, 1906 and 1907 respectively. Chiefly known to occur in the forests of the foothills of Luzon. There seems to be a great variation of foliage or else more than one form exists. The figs of this species are always globose, the larger ones 7 cm. in diameter.

16. **F. apiocarpa Miq.** in Ann. Mus. Lugd. Bat. 3; 269 and 289, 1863-9. *Urostigma apiocarpa Miq.* l. c. 440.—A subscandent shrub, or suberect and tree like, 4 m. high; wood tough and hard, covered with smooth light gray bark; branchlets thick, rigid. Leaves scattered, alternate, also rigid, flat, ovately oblong, dark shining green above, tassellate beneath or brownly spotted with dirty white reticulate borders, glabrous, the average blade 16 cm. long and 9 cm. wide just below the middle, margins entire, subinvolute, apex abruptly acuminate, base broadly rounded; midvein and lateral nerves prominent beneath, 4 to 6 pairs, submarginally united, the basal pair much ascending, the secondary ones frequently quite evident; petiole 3 to 5 cm. long, stout, very thick, reddish brown when not covered with lighter brown scales, in drying separating from the stems; bud scale 1.5 cm. long, subglabrous, sharply acuminate, convolute, dark brown.

Receptacles usually solitary from the leaf axils, 3 to 4 cm. long, ellipsoid, equally rounded at both ends, hard, greenish and smooth, with a milky white very thick and gummy juice, umbilicus simply apiculate, upon a 1.5 cm. long pulverulent recurved peduncle; the 3 lobed bracts at the base united and enclosing the base of the peduncle, about 5 mm. long; gall flowers 5 mm. long; the pedicel slender, 2 mm. long, glabrous, brown; the perianth of 3 brown linear or ligulate 3 mm. long segments, deciduous; smooth ovary 2 mm. long, 1 mm. thick, ellipsoid, upon a slender 1 mm. long pedicel; style subterminal, 1 to 2 mm. long, slender; staminate flower nearly 4 mm. long, glabrous, the thick brown pedicel about 1 mm. long; filament very similar, easily detached, but not as long and usually crooked; perianth of 3 brown and brittle segments, linear, setaceously acuminate, 1.5 mm. long; anther at most 2 mm. long, 1.25 mm. broad, curved, light yellow.

Specimen 7445, *A. D. E. Elmer*, Lucban, Province of Tayabas, Luzon, May, 1906. Only one plant was discovered in damp woods near the base of Mount Banahao at 700 meters. Except for the shorter peduncles, fewer nerved leaves and the shape of the receptacle it is typical of the species reported to be common in the Malayan Peninsula and Archipelago. Not previously reported from the Philippines.

IV. SYCIDIUM.

17. **F. benguetense Merr.** in Govt. Lab. Publ. 29; 10, 1905.

Specimens 7454 and 9358, *A. D. E. Elmer*, Lucban, Province of Tayabas, Luzon, May, 1906 and 1907 respectively.

18. **F. benguetense leytensis Elm.** Leaf. Philip. Bot. 1; 194, 1906.

Represented by 7456, *A. D. E. Elmer*, Lucban, Province of Tayabas, Luzon, May, 1906. In our specimen this variety is chiefly distinguished by the pyriform receptacles. Previously known only from the Island of Leyte.

19. **F. hauili Blco.** Fl. Filip. ed. 1; 884, 1837.

Specimen 9361, *A. D. E. Elmer*, Lucban, Province of Tayabas, Luzon, May, 1907.

20. **F. magnifica Elm.** Leaf. Philip. Bot. 1; 51, 1906.

Specimens 7515 and 9378, *A. D. E. Elmer*, Lucban, Province of Tayabas, Luzon, May, 1906 and 1907 respectively. It was rarely found in damp woods of low ground at 750 meters along the old road from Lucban to the town of Tayabas. In our region it appears as a dwarfed form of the stately trees in the type locality, and its figs are mostly subsessile and with obsolete bracts. Apparently the flowers are all fertile female only, bringing the species under the section *Sycidium* rather than under *Urostigma*.

21. **F. manilensis Warb.** in *Perkin's* Frag. Fl. Philip. 199, 1905. *F. rudis arborea Elm.* Leaf. Philip. Bot. 1; 54, 1906.

Specimen 9366, *A. D. E. Elmer*, Lucban, Province of Tayabas, Luzon, May, 1907. This species is always noticed along water courses of rather open dry hot places. Our specimen was collected on the road towards Sampaloc.

22. **F. guyeri Elm.** Leaf. Philip. Bot. 1; 196, 1906.

Specimens 7512 and 9359, *A. D. E. Elmer*, Lucban, Province of Tayabas, Luzon, May, 1906 and 1907 respectively. In our region it is confined to the woods skirting the base of Mount Banahao at 850 meters, and probably represents the center of its distribution. More southward than Luzon it is not at all common.

23. **F. angustissima Merr.** in Govt. Lab. Publ. 29; 11, 1905.

Represented by 9357, *A. D. E. Elmer*, Lucban, Province of Tayabas, Luzon, May, 1907. A low laxly branched undershrub in the woods of a dry ridge on Mount Banahao at 800 meters. Only one sterile plant was observed. The type was collected at Bosoboso, Province of Rizal, Luzon. Last year the writer secured fine fruiting specimens at Los Baños, Province of Laguna, Luzon, which were distributed under number 8179. More recently it was sent up from Camp Keithley, Lake Lanao, Mindanao. It has strong affinities to the Philippine *F. cumingii Miq.* and to the Celebes *F. irregularis* of the same author.

24. **F. sinuosa Miq.** in Lond. Journ. Bot. 7; 232, 1848. *Merrill* in Philip. Journ. Sci. 1, Suppl. 1; 45, 1906.

Specimen 9377, *A. D. E. Elmer*, Lucban, Province of Tayabas, Luzon, May, 1907. It was collected on gravelly banks of the Mahapon River near Sampaloc. There can be no question that our specimen is typical of number 1921 which *Cuming* collected in the Philippines and on which *Miquel* based his description. In *King's* monograph of the Species of Ficus of the Indo-Malayan and Chinese Countries, it is reduced to *F. quercifolia Roxb.* Still there is some doubt whether our erect shrubby Philippine form is really the same as that from the Malay Islands and which is described as a small ground creeper. In its typical form it occurs at sea level near the coast and whether the variable forms of the higher interior regions can be classed with it is doubtful.

25. **F. quercifolia humilis (Roxb.) King** in Ann. Roy. Bot. Gard. Calc. 1; 78, 1887.—Erect, rather stiff shrub, 2 to 3 m. high; wood finely grained, medium hard, with light gray bark; branchlets hollow, the ultimate ones 3 mm. thick, brown and scabrous. Leaves scattered, very harsh on both sides, duller beneath, exceedingly variable in size and shape, ovately oblong or obliquely rotund, inequilateral, base broadly rounded to subcordate and oblique, apex abruptly acute, subentire or the younger ones distantly serrate, finely punctate beneath; nerves 3 to 5 on each side, ascendingly curved, very prominent beneath, cross bars and reticulations

nearly as prominent, all hispidly puberulous; petiole 5 mm. long, hispid, terete, 2 mm. thick.

Receptacles short pedunculate, 1 to 3-clustered in the leaf axils, globose, hard and scabrous, ultimately becoming soft, smooth and purplish; flowers only male and gall in the same receptacle; staminate flowers 4 mm. long, circling beneath the umbilical scales, upon thick spongy 1 mm. long pedicel; its perianth hyaline, at most 3 mm. in length, of about 5 unequal segments enclosing the single stamen; filament 0.5 mm. long, with a 1 mm. long much reduced pistil diverging from its base; anther 1.25 mm. long, about 1 mm. wide, truncate at both ends or narrower towards the apex; gall flowers mostly empty, upon glabrous 5 mm. long and 2 mm. thick spongy pedicels or the younger ones subsessile; the perianth segments free, linear ligulate or oblanceolate, very hyaline, 3 mm. long; ovary sessile, nearly 2 mm. long, a trifle less in diameter, ellipsoid, smooth, yellowish brown, much exceeded by the perianth segments; style sublateral, erect, 1 mm. in length, subclavate.

Specimen 7447, *A. D. E. Elmer*, Lucban, Province of Tayabas, Luzon, May, 1907. The vestige of a rudimentary pistil in the staminate flowers of our specimens indicates a relation to the section *Palaeomorphe.* Along streamlets and irrigation ditches of rather open places. It is not identical with the previous species nor is it the same as my number 7179 from the Island of Leyte.

26. **F. banahaensis n. sp.**—Tree, 15 m. high, with a 4 dm. thick trunk; wood white, soft; branches rather numerous, forming a round topped crown; bark brown or grayish mottled, roughened with numerous lenticels; the young terminal portion of the twigs brown, glabrous, quite soft and watery. Leaves terminally clustered, alternating and closely crowded, oblong to subelliptic, obtusely rounded at both ends, apex abruptly acuminate and usually recurved, margins entire or obscurely wavy toward the apex, medium sized blades 13 cm. long, 5 cm. wide across the middle, flat, submembranous, glabrous, yellowish green beneath at least in the dry state, occasionally a trifle inequilateral; nerves conspicuous beneath, 3 to 5 pairs, the basal pair much as-

cending, anastamosingly united at their ends, reticulations brown, also conspicuous; petiole straight, glabrous, rather slender, from 1 to 5 cm. in length; bud scales 1 cm. long, subglabrous, sharply and triangularly acuminate.

Receptacles chiefly in pairs from the axils of fallen leaves, subglobose to obovoid or more or less irregular in shape, at least 1 cm. in diameter, yellowish red when ripe, with lighter yellow spots; annulus of the ambilicus quite conspicuous; peduncles 5 mm. long, subglabrous, terminated by 3 obtusely rounded dark brown glabrous bracts; flowers fertile female and neuter apparently; the neutral flowers or the dwarfed fertile female flowers confined immediately beneath the umbilical scales, considerably shorter than the scales circling around the upper side and the pistillate flowers forming the lower border, quite numerous and closely set, 2 mm. long, with a 0.5 mm. long pedicel; the perianth segments glabrous, brown, usually 5 in number, the outer ones 1.5 mm. long, the inner ones smaller, apparently all free, oblong, strongly imbricated and more or less clavate or columnar in appearance; fertile female flowers both subsessile and slenderly stipitate, the longer stipes 2 mm. long; perianth brown, very unequal in length, glabrous, the longer ones 2 mm. long, the basal portion at first united but finally becoming free; the ovary compressed, subrugose, light straw color, the marginal ridge confluent and attenuate at the base, nearly 2 mm. long, 1.5 mm. wide, broadly rounded at the apex; style lateral, ascendingly curved, terminated by a darker colored stigma; syconium densely hairy at least in the region of the neutral flowers.

Type specimen 7895, *A. D. E. Elmer*, Lucban, Province of Tayabas, Luzon, May, 1907; also 7479, from the same locality. Of this rare species only two trees were discovered in rather dry woods on Mount Banahao at 825 meters. Both trees bore an abundance of fruit, so much that the twigs immediately beneath the foliage were entirely concealed. Without staminate flowers there still remains some doubt as to the proper section. Apparently it is nearest related to *F. blepharostoma Warb.* of the *Sycidium* section. Our specimen has longer petioles, leaves not ovately oblong, without subcordate bases, the margins not remotely dentate, nor are the blades ever larger than 13 cm. long and 5 cm. wide. It also resembles some Philippine species of *Ficus* belonging to the section of *Eusyce*.

27. **F. lucbanensis n. sp.**—Erect shrub or tree like, widely spreading, 3 to 5 m. high; wood soft, whitish, the older portions covered with smooth brown bark, that of the branchlets yellowish gray and glabrous. Leaves scattered along the twigs, alternate, coriaceous, extremely variable in size, also glabrous, flat, horizontally spreading, oblong, the smaller ones frequently obovate, the larger ones 2 dm. long, 9 cm. wide across the middle, acute apex rather bluntly pointed, base obtuse or subcuneate, lustrous green above and in the dry state characteristically blotched, beneath paler green and umber brown when dry, margins entire; petiole glabrous, varying from 2 to 5 cm. long, quite thick and succulent, persistent and with conspicuous rings just above the place of attachment; nerves beneath shining castaneus brown, the lateral ones 5 to 9 on each side, ascendingly curved above the middle and anastomosing toward their ends, conspicuous beneath but also visible from the upper surface, reticulations faint; bud scales glabrous, convolute, at least 1.5 cm. long, sharply acuminate.

Receptacles chiefly in the leaf axils, 1 to 3-clustered, smooth, becoming soft and whitish when mature, the younger green ones with pale white spots, variable in size and shape, subglobose to obovoid, or flattened at both ends, averaging 1 cm. in diameter; peduncles glabrous, 3 to 5 mm. long, flattened, terminated at the distal end by 3 minute bracts; umbilicus not raised, frequently sunken; flowers male and gall only; the staminate flowers few, concealed amongst the inner umbilical bracts, 2 mm. long, monandrous; its perianth soft, glabrous, brown, gamophyllous, 1.5 mm. long, cup shaped, somewhat constricted toward the base, 1 mm. across; filament 1 mm. long, rather soft and flattened, glabrous; anther ultimately exerted, 0.75 mm. long, fully as wide, the ends truncate or obscurely biauriculate at the base; gall flowers dark brown, 2 mm. long, upon 1 mm. long pedicels; the mature insect ovary obovoid, 1 mm. across, exceeding the bracts, base short stipitate; involucral bracts 3, glabrous, oblong, subelliptic to obovate; style very short, lateral; those nearly sessile probably fertile, smaller but with a similar perianth.

Type specimen 7541, *A. D. E. Elmer*, Lucban, Province of Tayabas, Luzon, May, 1906; also 7632 from the same locality. The author collected it in the Province of Benguet, Luzon, three years ago and it has been confused with *F. benguetense Merr.*, its nearest ally. In our region it is very common in the woods and in ravines skirting the base of Mount Banahao at 800 meters.

28. **F. tayabensis n. sp.**—A tall and numerously branched climber, 15 m. high; stems tough, about 5 cm. thick, round, conspicuously ringed or falsely jointed every 2 to 3 dm. apart; wood porous, soft, reddish on the interior, covered with brown lenticelled bark; branchlets short brown pubescent when young, not rigid but comparatively short and crooked, forming tangled bushy masses near the top. Leaves alternate, widely scattered along the branchlets, flat or only slightly recurved at the apex, deep dull green above, much paler beneath, glabrous, quite unequal in size, ovately oblong to subelliptic, apex short acute, base rounded, chartaceous, margins entire or obscurely wavy toward the apex and subinvolute, the larger blades 13 cm. long and 7 cm. wide at most, beneath finely tassellate; nerves very prominent beneath, 5 to 7 on each side, straight, much ascending, parallel, their distal ends curved and united, reticulations obscure; petiole stout, 1 to 2 cm. long, short rusty pubescent but soon becoming glabrous; bud scales 1 cm. long, soft, light brown on the outside.

Receptacles 1 to 3-clustered, in the leaf axils or in the axils of the fallen leaves, or occasionally clustered upon short suberect unbranched tubercles on the stem, subpendulous, ovoid or subglobose, dull red, the base abruptly contracted into a slender 3 mm. long stalk, umbilicus evenly rounded with the syconium; flowers apparently fertile female and neutral only; the neutral flowers or possibly only the dwarfed fertile female in a circle beneath the umbilical scales, subsessile, arched; its segments dark brown, quite rigid, very unequal, glabrous, free, usually only 5, oblanceolate with ventrally folded sides and sharply inflexed tips; fertile female flowers upon 1.25 mm. long slender pedicels, at least 4 mm. in length; the perianth erect, rather stiff, of 3 unequal segments, apex subtruncate, cuneately narrowed clear to the base, glabrous, dark brown, at most 0.5 mm. wide near the apex, united around the pedicel but easily separating from it; ovary smooth, elongated, subcompressed, 2 mm. long, at most 0.75 mm. wide, the edges forming an obtusely rounded apex and a slender cuneate base; seed bean shaped; style 1 mm. long, very slender, erect and nearly terminal.

Type specimen 8266, *A. D. E. Elmer*, Lucban, Province of Tayabas, Luzon, May, 1907. This unique species was only once met two miles out from Lucban towards the town of Tayabas on the old abandoned road. It inhabited dense woods in a low damp flat. The foliage is identical to *F. bordeni Merr.* but with entirely different fruits.

V. COVELLIA.

29. **F. repandifolia Elm.** Leaf. Philip. Bot. 1; 58, 1906.

Represented by 9374, 7855, 7455 and 7531, *A. D. E. Elmer*, Lucban, Province of Tayabas, Luzon, May, 1906 and 1907. This species occurs in the woods of Mount Banahao at 800 meters and in humid forests toward Sampaloc at 500 meters. In our locality it is quite common. It has also been collected on Mount Mariveles and in the Province of Benguet, Luzon.

30. **F. minahassae Miq.** in Ann. Mus. Lugd. Bat. 3; 231 and 296, 1836–9.

Represented by 7641, *A. D. E. Elmer*, Lucban, Province of Tayabas, Luzon, May, 1907. It is one of the most remarkable species of *Ficus* in the Philippine Islands. It has rather constant characters in general and no near relative. It is probably more abundant in our Archipelago than in the Celebes, its type locality.

31. **F. barnesii Merr.** in Govt. Lab. Publ. 17; 12, 1904.

Represented by specimen 7816, *A. D. E. Elmer*, Lucban, Province of Tayabas, Luzon, May, 1907. So far this species is represented from middle and north central Luzon and from the Island of Leyte. Our specimen has not the characteristic maroon colored hairs on the ends of the twigs, petioles and along the veins beneath the leaves. It is the same form as my number 8022 from Twin Peaks, Province of Benguet, Luzon.

32. **F. nota (Blco.) Merr.** in Govt. Lab. Publ. 17; 10, 1904. *F. aspera nota Blco.* Fl. Filip. ed 1; 677, 1837.

Represented by specimens 7472, 7710, 7804 and 9367, *A. D. E. Elmer*, Lucban, Province of Tayabas, Luzon, May, 1906 and 1907. Very common in this locality, more or less shrubby in exposed thickets, quite tall trees in sheltered places of ravines.

33. **F. pseudopalma Blco.** Fl. Filip. ed. 1; 680, 1837.

Represented by 9372, *A. D. E. Elmer*, Province of Tayabas, Luzon, May, 1907. Here and there in dense thickets bordering meadows and rice fields but nowhere common. *Blanco* most certainly secured his specimen from middle Luzon, since he quotes the Tagalog vernacular name. Some five miles north of Baguio, Province of Benguet, Luzon, a rank tree like specimen with stems 7 cm. in diameter and about 7 m. high was observed to be 2 to 3-branched near the top. The southern form south of Luzon is different and will be discussed in another article.

34. **F. linearifolia n. sp.**—Erect tree, 20 m. high, branched from below the middle; ultimate branches very numerous, 3 mm. thick, lax and subpendulous; the apical portion of the young twigs soft brown pubescent. Leaves more or less scattered, but usually confined towards the ends of the branchlets, alternate, membranous, slightly subfalcate and inequilateral, linear lanceolate, 2 dm. long, 2.5 cm. wide across the middle, or frequently much smaller, slenderly tapering toward the long acuminate tips, base subcuneate and with rather abrupt and slightly inequal basal point, above glabrous and minutely punctate with yellowish white spots, beneath paler green and with a rusty brown pubescence along the veins and reticulations, with entire margins; midvein prominent beneath, slightly oblique below the middle; the lateral nerves from 5 to 7 or even 9 on each side, ascendingly curved, those above the middle rather obscure and irregular, submarginally united; petiole 3 to 5 mm. long, densely rufous brown pubescent.

Infrutescence upon slender woody branched tubercles, 8 to 18 dm. long, the branches subpendulous, brown, glabrous, upon the lower portion of the stem; receptacles chiefly at the ends of the branchlets, in alternating clusters of 1 to 3, subglobose, smooth or brown puberulous in the young state, averaging 2 cm. in diameter, usually spotted with yellowish white lenticels, erect when young, pendulous, soft and whitish when mature, the slightly raised umbilicus broad and truncate, sessile or more commonly with a distinct pedicel when young; peduncle about 2 cm. long, brown puberulous or subglabrous, flattened, tribracteate at the apex; flowers only gall and male in the same receptacle; the staminate clustered beneath the umbilical scales, 2 mm. long; the base subtended by a subgamophyllous perianth; the outer 2 to 3 perianth segments becoming free, oblong to obovate, membranous, brown, the inner segment closely enfolding the solitary stamen; filament 0.75 mm. long, glabrous; anther as long and nearly as broad, truncate or emarginate at both ends; young gall flowers sessile, compressed; the mature ones upon a thick 1.5 mm. long pedicel; the smooth ovary ellipsoid to subovoid, 1.5 mm. long, 1.25 mm. in diameter, smooth, dark brown, bearing a very blunt apiculate subterminal style, evidently without perianth, but the inner surface of the syconium is provided with brown ciliate hairs.

Type specimen 7428, *A. D. E. Elmer*, Lucban, Province of Tayabas, Luzon, May, 1906; also 7604 and 9364, by the same collector and from the same locality. In low damp wooded ground or along streams in deep ravines at the base of Mount Banahao at 750 meters. Quite a number of trees were seen in this region only. It has some affinities to *F. barnesii Merr.*

VI. EUSYCE.

35. **F. ruficaulis Merr.** in Govt. Lab. Publ. 17; 13, 1904.

Specimens 7477 and 9373, *A. D. E. Elmer*, Lucban, Province of Tayabas, Luzon, May, 1906 and 1907 respectively. Our material is typical and was collected in woods at 700 meters.

36. **F. odorata (Blco.) Merr.** in Govt. Lab. Publ. 17; 15,

1904. *F. hispida odorata Blco.* Fl. Filip. ed. 1; 686, 183: ed. 2; 476, 1845: ed. 3; 89, 1879.

Specimen 9368, *A. D. E. Elmer*, Lucban, Province of Tayabas, Luzon, May, 1907. This species was not found to be endemic in the woods of our region. The fact that it is quite common in the town of Lucban and that it serves an economic purpose leads me to believe that it has been introduced. Just before festive times its foliage is extensively collected for cleaning purposes. No fruits were found.

37. **F. propinqua Merr.** in Govt. Lab. Publ. 29; 9, 1905.—A tall and straggling climber, forming tangled bushes upon trees in forests at 800 meters of Mount Banahao; stems and branches crookedly branched, rigid and more or less twisted; tough and hard wood covered with gray and brown mottled bark. Leaves also rigid, smooth, shining green on upper surface, recurved especially toward the tips. Figs ascending, in axils of the leaves or in the axils of fallen leaves, 1 to 3-clustered, orange red, but becoming soft and turning to a dark wine color when ready to drop.

Specimens 7437 and 9369, *A. D. E. Elmer*, Lucban, Province of Tayabas, Luzon, May, 1906 and 1907 respectively.

38. **F. gigantifolia Merr.** in Govt. Lab. Publ. 29; 9, 1905.—Small tree, 7 m. high, with very soft white wood; bark smoothish, conspicuously mottled; branches long, widely spreading, sparingly rebranched; the ends of the twigs smooth, soft and suberect, 8 mm. thick. Leaves alternate, few, chiefly at the ends of the twigs, horizontally spreading or descending, flat, coriaceous, lucid deep green above, much paler beneath, glabrous, early falling, leaving large subrotund scars beneath the consipicuous rings of the twigs, drying brown, medium sized blades 3 dm. long, 2 dm. wide, ovately rotund, edges entire, bases broadly rotund or shallowly cordate, bluntly obtuse at the apex; petiole 3 to 4 cm. long, thick, smooth, glabrous; primary nerves 9 to 13 pairs, divaricate from the midvein, ascendingly curved above the middle, their ends strongly interarching, reticulations and secondary nerves quite evident; bud scales glabrous, strongly conduplicate, 12 mm. wide at the base, gradually tapering to a setaceous point.

Receptacles immature, shining green, normally from the leaf axils, sessile, subglobose, subtended by 3 acuminate bracts.

Represented by 9360, *A. D. E. Elmer*, Lucban, Province of Tayabas, Luzon, May, 1907. It was found on dry gravelly ridges near the Mahapon River in the vicinity of Sampaloc. Our material is typical and aside from type specimen from the Island of Burias, it is the only true *F. gigantifolia Merr.* known.

VII. NEOMORPHE.

39. **F. latsoni Elm.** Leaf. Philip. Bot. 1; 204, 1906.

Specimen 7432, *A. D. E. Elmer*, Lucban, Province of Tayabas, Luzon, May, 1906. Quite rare.

40. **F. integrifolia Elm.** Leaf. Philip. Bot. 1; 61, 1906.

Specimen 7920, *A. D. E. Elmer*, Lucban, Province of Tayabas, Luzon, May, 1907. In woods of low damp ground. Its range extends from Bataan Province and throughout middle northern Luzon. It is more abundant, however, in the mountainous districts of the northern provinces and apparently is quite variable as to size, texture of its foliage, and has either glabrous or slightly pubescent leaves and receptacles.

41. **F. glomerata Roxb.** Cerom. Pl. 2; No. 123, 1795 to 1819.—Tall widely spreading tree, 20 m. high, with short 1.5 m. thick stems which soon divide into large main branches; wood soft, whitish; bark thick, reddish except the rather smooth grayish white or mottled outer surface; ultimate branches slender, lax, divaricately branched, the younger portions glabrous. Leaves submembranous, drying brown, smooth, dark green on the upper surface, quite a little paler beneath, nearly flat, very variable in size, alternatingly scattered along the young twigs, ovately lanceolate to narrowly oblong, apex acute to subacuminate, base broadly rounded, margins entire, glabrous, the larger blades 15 cm. long and 5 cm. wide; lateral veins 8 to 11 pairs, brown, conspicuous beneath, reticulations faint and minute; petiole glabrous, 1 to 4 cm. long, slender; bud scales brown, 1 cm. long, sharply acuminate, the middle outer portion short canescent.

Receptacles clustered upon 5 to 15 cm. long stiff woody sparingly rebranched tubercles arranged along the branches, obovoid, 3 to 4 cm. long, 2.5 cm. in diameter; peduncle 2.5 cm. long, without bracts; syconium very thick, full of pale white gummy juice, smooth, corrugated toward the low blunt umbilicus, streaked with dark apple red and spotted with minute whitish lenticels; apparently with only gall and male flowers; staminate ones 3.5 mm. long, broadly clavate, diandrous, upon 1 mm. long stalk; the perianth of 3 closely imbricate segments, encasing the stamens, membranous, brown, the lobes oblong to obovate; filaments only 1 mm. long, glabrous, confluent; anther broadly oblong; 1 mm. long, nearly as broad; gall flowers 3.5 mm. long, upon a 2 mm. long stalk; perianth united and surrounding the stalk, terminated by 3 setaceous 0.75 mm. long segments; insect containing ovary subellipsoid, 1.5 mm. long, sessily set upon the perianth stalk and closely surrounded by its teeth; brown style, straight, sublateral, quite thick especially toward the apex, at most 0.75 mm. long; stigma suboblique, thicker, in our specimen densely coated with pollen grains; younger nearly sessile pistils intermixed with the mature ones.

Represented by 9379, *A. D. E. Elmer*, Lucban, Province of Tayabas, Luzon, May, 1907. In thin woods bordering open small valleys near the old abandoned roadway between Lucban and Tayabas. *Roxburgh's* species has not been reported from the Philippines before, and our specimen can scarcely be separated from the variable British Indian tree. This is the same as 8835 from Baguio, Province of Benguet, Luzon, and which was distributed under the name of *F. variegata Blm.*

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LEAFLETS
OF
PHILIPPINE BOTANY

A COLLECTION OF PHILIPPINE POLYPORES

BY

WILLIAM A. MURRILL

SUBSCRIPTION PRICE 2 CENTS PER PAGE
MANILA, P. I.

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EDITED BY A. D. E. ELMER, A. M.

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A COLLECTION OF PHILIPPINE POLYPORES

BY

WILLIAM A. MURRILL.

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The following interesting specimens of polypores were sent to me about a year ago from the Philippine Islands by *Mr. A. D. E. Elmer*, who has made explorations on Mt. Mariveles and Mt. Banahao in Luzon and at Palo in Leyte.

A number of Philippine species which have been seen in European herbaria have as yet failed to appear in these and other recent collections, but it is hoped that the list will be complete enough in a year or two more so that a fairly full synopsis of Philippine polypores will be possible. Excursions into the interior of the larger islands will undoubtedly bring to light a considerable number of novelties, while further explorations among the smaller islands will serve more strongly to connect the native species with their relatives in Formosa, China, Japan, Malacca, Borneo, Java, Celebes, New Guinea, Australia, and the many small neighboring islands of the Pacific.

Subfamily POLYPOREAE

Coltricia cinnamomea (**Jacq.**) **Murrill,** Bull. Torrey Club 31: 343. 1904.

Luzon: Mt. Mariveles. *Elmer* 6949.

Coriolopsis aneba (**Berk.**) **Murrill,** Bull. Torrey Club 34: 466. 1907. *Polyporus anebus Berk.* Lond. Jour. Bot. 6: 504.

1847 (Type from Ceylon.) *? Polyporus bicolor Jungh.* Fl. Crypt. Jav. 1: (54). 1838. (Type from Java.)

Luzon: Mt. Mariveles, *Elmer 6909*.

Coriolopsis dermatodes (**Lév.**) **Murrill,** Bull. Torrey Club 34: 466. 1907. *Trametes dermatodes Lév.* Ann. Sci. Nat. Bot. III. 2: 196. 1844. *? Polyporus cervino-gilvus Jungh.* Fl. Crypt. Jav. 1: (45). pl. 9. 1838. (Type from Java.) *Polyporus dermatodes Lév.; Gaud.* Voy. Bonite 1: 180. pl. 138. f. 2. 1846. *Polyporus peradeniae Berk. & Br.* Jour. Linn. Soc. Bot. 14: 51. 1885. (Type from Ceylon.)

Luzon: Mt. Mariveles, *Elmer* 6936, 6957.

Coriolopsis semilaccata (**Berk.**) **Murrill,** Bull. Torrey Club 34: 466. 1907. *Polyporus zonalis semilaccatus Berk.* Jour. Linn. Soc. Bot. 16: 46. 1878. (Type from Malamon.) *Fomes semilaccatus* (*Berk.*) *Cooke*, Grevillea 15: 22. 1886.

Luzon: Mt. Mariveles, *Elmer* 6929, 6946; Mt. Banahao, *Elmer* 7557.

Coriolus atypus (**Lév.**) **Pat.** Tax. Hymén. 94. 1900. *Polyporus atypus Lév.* Ann. Sci. Nat. Bot. III. 2: 184. 1844. (Type from Java.) *? Polyporus brunneolus Berk.* Lond. Jour. Bot. 3: 187. 1844. (Type from the Philippines.) *? Polystictus didrichsenii Fr.* Nov. Symb. 76. 1851. (Type from the island of Bora-bora.) *Trametes aurora Ces.* Myc. Borneo 5. 1897. (Type from Borneo.)

Luzon: Mt. Mariveles, *Elmer* 6938, 6940, 6947, 6955, 6958.

Coriolus maximus (**Mont.**) **Murrill,** Bull. Torrey Club 34: 467. 1907. *Irpex maximus Mont.* Ann. Sci. Nat. II. 8: 364. 1837. (Type from Cuba.) *Polyporus meyenii Kl.* Nov. Act. Acad. Nat. Cur. 19: Suppl. 236. 1843. (Type from Manila.)

Luzon: Mt. Mariveles, *Elmer* 6931.

Coriolus murinus (**Lév.**) **Pat.** Tax. Hymén. 94. 1900. *Polyporus murinus Lév.* Ann. Sci. Nat. Bot. III. 2: 185. 1844. (Type from Java.)

Leyte: Palo, *Elmer* 7237.

Coriolus vernicipes (**Berk.**) **Murrill,** Bull. Torrey Club 34: 468. 1907. *Polyporus vernicipes Berk.* Jour. Linn. Soc. Bot. 16: 50. 1878. (Type from Japan.)

Luzon: Mt. Banahao, 650 m., *Elmer* 7550.

Cycloporellus microcyclus (Lév.) Murrill, Bull. Torrey Club 34: 468. 1907. *Polyporus microcyclus Lév.* Ann. Sci. Nat. Bot. III. 2: 188. 1844. (Type from Java.)

Luzon: Mt. Mariveles, *Elmer* 6937. Leyte: Palo, *Elmer* 7228.

Earliella corrugata (Pers.) Murrill, Bull. Torrey Club 34: 468. 1907. *Polyporus corrugatus Pers.; Gaud.*, Voy. Freyc. Bot. 172. 1826. *Polyporus fusco-badius Pers.; Gaud.* Voy. Freyc. Bot. 172. 1826. (Type from the Marianne Islands.) *Polyporus scabrosus Pers.; Gaud.* Voy. Freyc. Bot. 172. 1826. (Type from the Marianne Islands.) *? Polyporus mariannus Pers.; Gaud.* Voy. Freyc. Bot. 173. 1826. (Type from the Marianne Islands.) *Daedalea sanguinea Kl.* Linnaea 8: 481. 1833. (Type from the East Indies.) *? Trametes bicolor Berk.* Trans. Linn. Soc. Bot. 16: 43. 1878. (Type from the island of Aru.) *Polystictus persoonii Cooke*, Grevillea 14: 85. 1886. *Trametes nitida Pat.* Jour. de Bot. 4: 17. 1890. (Type from Tonkin.)

Luzon: Mt. Mariveles, *Elmer* 6921, 6935. Leyte: Palo, *Elmer* 7206, 7208.

Favolus tenuis (Hook.) Murrill, Bull. Torrey Club 32: 100. 1905. *Polyporus bivalvis Pers.; Gaud.* Voy. Freyc. 168. 1826. (Type from Rawak.) *Hexagona orbiculata Fr.* Fung. Guin. f. 9. 1837. (Type from Guinea.) *Hexagona cervino-plumbea Jungh.* Crypt. Java 61. f. 32. 1838. (Type from Java.) *Hexagona thwaitesii B. & C.* Proc. Am. Acad. Arts & Sci. 4: 122. 1860. (Type from Bonin island.)

Luzon: Mt. Mariveles, *Elmer* 6927, 6934. Leyte: Palo, *Elmer* 7226.

Favulus wightii (Kl.) Ricker, Philip. Jour. Sci. 1: Suppl. 286. 1906. *Polyporus wightii Kl.* Linnaea 7: 200. pl. 10. 1832. *Hexagona wightii Fr.* Epicr. 496. 1838.—Pileus thin, coriaceous, flexible, umbonate-affixed, dimidiate to reniform, applanate when young, becoming deeply depressed with age, 5–10 x 7–16 x 0.2 cm., surface multizonate, marked with a few concentric ridges, pale-umbrinous and nearly glabrous when young, then chestnut-colored with a few appressed aculeae, and finally opaque-black and clothed with conspicuous, erect or ascending, rigid, flattened, somewhat branched, black aculeae; margin very thin, isabelline, undulate or slightly lobed: context scarcely 1 mm. thick, tough, punky, fibrous; tubes 1.5 mm. long, cinereous or fulvous and glabrous within, mouths large, shallow, equally hexagonal, 1-3 mm. in diameter, cinereous or fulvous, edges thin, rarely obtuse, firm, entire.

Luzon; Mt. Mariveles, *Elmer* 6913, 6919.

Hapalopilus gilvus (Schw.) Murrill, Bull. Torrey Club 31: 418. 1904. *Polyporus discipes Berk.* Lond. Jour. Bot. 6: 499. 1847. (Type from Ceylon.) *Polyporus holosclerus Berk.* Lond. Jour. Bot. 6: 501: 1847. (Type from Ceylon.) *Polyporus spadiceus Berk.* Ann. Mag. Nat. Hist. 3: 388. 1839. (Type from the East Indies.) *Polyporus breviporus Cooke.* Grevillea 12: 17. 1883. (Type from Australia.) *Polyporus aureomarginatus P. Henn.* Bot. Jahrb. 22: 72. 1895. (Type from Kamerun.)

Luzon: Mt. Mariveles, *Elmer* 6925.

Hapalopilus subrubidus Murrill, Bull. Torrey Club 34: 470. 1907.—Pileus imbricate, umbonate-sessile or attached by a narrow base, dimidiate or flabelliform, conchate, thin, slightly flexible, 3-4 x 4-6. x 0.1–0.3 cm.; surface glabrous, slightly zonate, fulvous; margin thin, straight, entire or slightly undulate, reddish-brown when bruised: context ferruginous, punky-fibrous, tough, 1-2 mm. thick; tubes short, dark-lilac within, 1 mm. in length, mouths minute, slightly angular, regular, 7-8 to a mm., edges thin, entire, dark flesh colored to fulvous: spores globose, smooth, hyaline, 3–4 *u*; hyphae 2-3 *u*, pale-ferruginous; cystidia none.

Type collected on Mt. Mariveles, Luzon, on dead wood, November, 1904, by *A. D. E. Elmer*, no. 6912.

Inonotus elmerianus Murrill, Bull. Torrey Club 34: 471. 1907.—Pileus subimbricate, sessile dimidiate, conchate, thin, slightly flexible, 3 x 4–5 x 0.1-0.3 cm.; surface finely tomentose to nearly glabrous, spongy-tomentose behind or in certain parts, very uneven, slightly zonate, ferruginous to fulvous, fuliginous at times behind; margin thin, undulate, ferruginous: context ferruginous, punky above, fibrous below, 1 mm. or less thick; tubes short, fulvous within, 0.5–1.5 mm. long, mouths very minute, regular, circular to angular, 9–11 to a mm., fulvous to umbrinous, bay when bruised, stuffed with flavous to luteous mycelium when very young, edges thin, entire: spores subglobose, smooth, pale-ferruginous, copious, 2 *u*: hyphae pale-ferruginous, 3–4 *u*; cystidia none.

Type collected on Mt. Mariveles, Luzon, on dead wood, November, 1904, by *A. D. E. Elmer*, no. 6942.

Nigroporus vinosus Murrill, Bull. Torrey Club 32: 361. 1905. (Type from San Domingo.)

. Leyte: Palo, *Elmer* 7212.

Polyporus coracinus Murrill, Bull. Torrey Club 34: 471. 1907.—Pileus suborbicular to reniform, attached by a short lateral tubercle, thin, fleshy-tough, conchate, 3–4 – 4–5 x 0.2 cm., surface yellowish-white, finely tomentose, becoming glabrous and black; margin thin, entire, concolorous: context less than 1 mm. thick, homogeneous and white to pallid, except the very thin black cuticle; tubes 1.5 mm. long, white to avellaneous within, mouths circular, regular, 4 to a mm., pallid to black, edges very obtuse, entire: spores subglobose, smooth, hyaline, 2.5–3.5 *u*; hyphae 3 *u*; cystidia dark-fulvous, short, ventricose, sharp-pointed, 10–25 *u*, often branched or caespitose.

Type collected at Palo, Leyte, on dead sticks, January, 1906, by *A. D. E. Elmer*, no. 7232.

Polyporus palensis Murrill, Bull. Torrey Club 34: 472. 1907.—Pileus flabelliform, tapering behind, shallowly depressed to infundibuliform, 2–3 x 2–3 x 0.1 cm.; surface white to fulvous, finely radiate-striate, glabrous, margin very thin, entire to undulate or lacerate, inflexed on drying: context very thin, fleshy, white, fragile when dry; tubes decurrent, less than 1 mm. long, white or slightly flesh-colored within, mouths minute, white to dull-fulvous, fragile when dry, somewhat radially elongated, 0.5 x 0.25 mm., edges lacerate-dentate, becoming almost irpiciform in appearance: spores oblong-ellipsoid, smooth, hyaline, 3–4 x 5–6 *u*; hyphae smooth, hyaline, 3–4 *u*; cystidia none: stipe lateral, rarely eccentric, short, tapering below, white, terete, striate above, covered with tubes below at the base, 3 mm. long, 2 mm. thick.

Type collected at Palo, Leyte, on dead sticks, January, 1906, by *A. D. E. Elmer*, no. 7236.

Polyporus perula (Beauv.) Fr. Epicr. 437. 1838. *Microporus perula Beauv.* Fl. Owar. 1: 12. pl. 43. 1805. (Type from Wari.) *Polyporus xanthopus Fr.* Obs. Myc. 2: 255. 1818. (Type locality unknown.) *Polyporus affinis Nees*, Nov. Act: Acad. Nat. Cur. 13¹: pl. 4. f. 1. 1826. *Polyporus incomptus Fr.* Epicr. 4: 7. 1838. (Type from Guinea.) *Polyporus polychrous Ces.* Myc. Borneo 4. 1879. (Type from Borneo.) *Polyporus carneo-niger Berk.; Cooke*, Grevillea 12f: 15. 1883. (Type from Australia.)

Luzon: Mt. Banahao, *Elmer* 7536, 7552, 7555; Mt. Mariveles, *Elmer* 6908, 6920, 6923, 6926.

Pycnoporus sanguineus (L.) Murrill, Bull. Torrey Club 31: 421. 1904.

Leyte: Palo, *Elmer* 7239.

Rigidoporus surinamensis (Miq.) Murrill, Bull. Torrey Club 34: 473. 1907. *Polyporus surinamensis Miq.* Bull. Sci. Phys. Nat. Néerl. 1839: 454. 1839. *Polyporus zonalis Berk.* Ann. Mag. Nat. Hist. 10: Suppl. 375. pl. 10. f. 5. 1843. (Type from Ceylon.)

Luzon; Mt. Banahao, 900 m., *Elmer* 7549.

Spongipellis luzonensis Murrill, Bull. Torrey Club 34: 473. 1907.— Pileus thin, tough, rigid, imbricate, laterally connate, sessile, dimidiate, somewhat decurrent, conchate, 1–1.5 x 1.5–2.5 x 0.2–0.5 cm.: surface azonate, anoderm, fibrillose-tomentose, white to discolored, absorbing water; margin thin, undulate, concolorous, easily bruised, fertile, decurved when dry: context spongy-fibrous, white to pale-isabelline, about 2 mm. thick, tubes white to discolored, tough, elastic. 2-3 mm. long, mouths white to discolored, irregular, 4–6 to a mm., subglistening, edges very thin, fimbriate-dentate: spores globose, smooth, hyaline, 3–4 *u;* hyphae hyaline, 5–6 *u;* cystidia none.

Type collected on Mt. Mariveles, Luzon, on dead wood, November, 1904, by *A. D. E. Elmer*, no. 6944.

Trametes caespitosa Murrill, Bull. Torrey Club 34: 473. 1907.—Hymenophore densely imbricate, dimidiate, conchate, laterally connate, 1-2 x 2-3.5 x 0.2-0.3 cm.; surface puberulent to subglabrous, smooth, very slightly subzonate, pale-avellaneous, with a tinge of pale-purple; margin rather thick, concolorous, undulate, sharply deflexed: context white, fibrous, rigid, tough, 1-2 mm. thick; tubes white to pallid, 1-1.5 mm. long, mouths very regular, minute, circular, white to pallid, with a tinge of flesh color, 7-8 to a mm., edges rather thick, firm, tough, entire: spores smooth, hyaline, ovoid, copious, 5-6 x 7-7.5 *u;* hyphae hyaline, 5-6 *u;* cystidia none.

Type collected on Mt. Mariveles, Luzon, on dead wood, November, 1904, by *A. D. E. Elmer*, no. 6951.

Trametes luzonensis Murrill, Bull. Torrey Club 34: 474. 1907.—Pileus small, laterally connate, dimidiate, sessile, rarely encircling the twig, conchate, 1.2 x 1.5-3 x 0.2-0.4 cm.; surface smooth, anoderm, finely tomentose to subglabrous, white to very pale avellaneous, entirely without marks; margin acute, entire, deflexed when dry: context punky, white, 1-2 mm. thick; tubes white within, 1-2 mm. long, tough, mouths regular, minute, circular, 6 to a mm., edges white to slightly discolored, rather thick, entire: spores smooth, hyaline.

Type collected on Mt. Mariveles, Luzon, on dead sticks, November, 1904, by *A. D. E. Elmer*, no. 6932.

Tyromyces elmeri Murrill, Bull. Torrey Club 34: 475. 1907.—Pileus fleshy, rigid and fragile when dry, dimidiate, sessile, subimbricate, 2-3 x 3-4 x 0.2-0.3 cm.; suface rough, with minute tubercles and pits, glabrous, white to isabelline; margin rather thick, entire, concolorous: context white, fleshy-tough, 1 mm. thick; tubes white to isabelline within, 2 mm. long, mouths slightly angular, minute, regular, 6-7 to a mm., pruinose, glistening, at length avellaneous, edges thin, entire: spores globose, smooth, hyaline, 3-4 *u;* hyphae hyaline, 4-5 *u;* cystidia none.

Type collected on Mt. Mariveles, Luzon, on dead wood, November, 1904, by *A. D. E. Elmer*, no. 6954.

Subfamily FOMITEAE

Amauroderma elmerianum Murrill, Bull. Torrey Club 34: 475. 1907.—Pileus stipitate, umbonate-affixed, subcircular to reniform, usually convex above, plane or slightly concave below, hard and rigid, 3 x 4-7 x 0.5-1 cm.; surface thinly encrusted, finely puberulent, conspicuously radiate-rugose, many times sulcate, marked with narrow, avellaneous, lines and broad, fuliginous or black zones; margin thick, truncate, zonate, crumpled or rugose, concolorous: context avellaneous, punky-corky, homogeneous, 2-4 mm. thick: tubes 3-7 mm. long, slender, avellaneous within, mouths regular, circular, constricted, 5-6 to a mm., nearly white to smoky-black, reddish-brown when bruised, edges thick, obtuse, entire: spores subglobose, very pale brown, finely echinulate, thick-walled, 5-6 *u*: hyphae subhyaline, 3-5 *u*, cystidia none: stipe laterally-attached, ascending, cylindrical, subequal, 3-12 cm. long, 0.7-1.3 cm. thick, resembling the pileus in surface and substance.

Type collected at Palo, Leyte, on dead stumps, January, 1906, by *A. D. E. Elmer*, no. 7210. Also collected on Mt. Mariveles, Luzon, November, 1904, by *Elmer*, no. 6960.

Elfvingia elmeri Murrill, Bull. Torrey Club 34: 476, 1907.—Pileus very large, compressed-ungulate, convex above, slightly concave below, sessile, dimidiate, very hard, 20 x 25–35 x 4–7 cm.; surface glabrous, deeply sulcate, tuberculose, horny-encrusted, becoming slightly rimose when old and dry, but never weathering, brown with a grayish tinge; margin thick, rounded, ferruginous, entire: context ferruginous to fulvous, punky-corky, rather firm, 1–2 cm. thick; tubes distinctly stratified, 1-2 mm. long each season, fulvous within, mouths circular, regular, 5 to a mm., edges rather thin, entire: spores ferruginous, globose, smooth, 5–6 *u;* hyphae ferruginous, 3–4 *u;* cystidia ventricose, fulvous, sharp-pointed, copious, 15–40 *u* long.

Type collected on Mt. Mariveles, Luzon, on dead wood, November, 1904, by *A. D. E. Elmer*, no. 6961.

Elfvingia tornata (Pers.) Murrill, Bull. Torrey Club 30: 301. 1903. *Polyporus tornatus Pers.; Gaud.* Voy. Freyc. Bot. 173. 1826. (Type from islands in the Pacific ocean.) *Polyporus australis Fr.* Elench. 108. 1828. (Type from islands in the Pacific ocean.)

Luzon: Mt. Mariveles, *Elmer* 6916. Leyte: Palo, *Elmer* 7209.

Fomes semitostus Berk. Jour. Bot. & Kew Misc. 6: 143. 1854. (Type from Khasia Mountains India.)

Luzon: Mt. Mariveles *Elmer* 6050. Leyte: Palo, *Elmer* 7222.

Ganoderma subtornatum Murrill, Bull. Torrey Club 34: 477. 1907.—Pileus sessile, short-stipitate flabelliform, with a narrow base, applanate, slightly concave below, hard and rigid, 6-11 x 6-12 x 1 cm.; surface thinly encrusted, shining-black, except where covered with the brown conidia, glabrous, sulcate, radiate-rugose; margin truncate, slightly furrowed, sterile, entire: context 2-4 mm. thick, punky, white above, chestnut-colored below; tubes unstratified, slender, 5-8 mm. long, avellaneous-umbrinous within, mouths regular, circular, 5 to a mm., smoky-fuliginous, edges obtuse, entire: spores ovoid, pale-brown, finely asperulate, 9 x 6-7 *u;* hyphae dark brown, 5-6 *u;* cystidia none: stipe lateral, compressed, 0.2 cm. long, 1.5-2 cm. thick, resembling the pileus in surface and substance.

Type collected on the Lamao River, Luzon, 100 m., on a decayed trunk, November, 1903, by *R. S. Williams.* Collected also on Mt. Mariveles, Luzon, November, 1904, by *Elmer*, no. 6943, and at Palo, Leyte, January, 1906, by *Elmer*, no. 7213.

Nigrofomes melanoporus (Mont.) Murrill, Bull. Torrey Club 31: 425. 1904. *Fomes melanoporoides Ces.* Myc. Borneo 6. 1879. (Type from Borneo.) *Fomes cornu-bovis Cooke*, Grevillea 13: 2. 1884. (Type from Malacca.) *? Polyporus cinereo-fuscus Curry*, Trans. Linn. Soc. II. 1: 124. pl. 13. f. 1. 1876. (Type from India.)

Luzon: Mt. Mariveles, *Elmer* 6959.

Pyropolyporus caliginosus (Berk.) Murrill, Bull. Torrey Club 34: 478. 1907. *Polyporus caliginosus Berk.* Jour. Linn. Soc. Bot. 16: 46. 1878. (Type from Philippines.) Not *Polyporus caliginosus Ces.* Myc. Borneo 5. 1879. (Type from Borneo.)

Leyte: Palo, *Elmer* 7221.

Pyropolyporus pectinatus (Kl.) Murrill, Bull. Torrey Club 34: 479. 1907. *Polyporus pectinatus Kl.* Linnaea 8: 485. 1833. (Type from the East Indies.) *Fomes pullus (Berk. & Mont.) Cooke,* Grevillea 14: 19. 1885. (Type from Java.)

Luzon: Mt. Mariveles, *Elmer* 6933.

Pyropolyporus williamsii Murrill, Bull. Torrey Club 34: 479. 1907.—Pileus bracket-shaped, sessile, dimidiate, plane above, convex below, very hard, horny and brittle, 5-8 x 8-15 x 1-2 cm., surface finely tomentose to glabrous, dark-bay to black, horny-encrusted, deeply and roughly sulcate, somewhat tuberculose, slightly cracking with age; margin isabelline, sterile, rounded, entire or undulate: context 8-10 mm. thick, ferruginous, hard, radiate-striate, with white dendroid markings; tubes distinctly stratified, 2-3 mm. long each season, umbrinous to avellaneous within, mouths circular, avellaneous, opaque, regular, 5 to a mm., edges thick, obtuse, entire: spores subglobose, smooth, hyaline, 3-5 *u*; cystidia dark-fulvous, ventricose, pointed, 15-30 *u* long.

Type collected on the Lamao River, Luzon, 80 m., on a dead trunk, December, 1903, by *R. S. Williams.* What appears to be a young, deformed specimen of this species was collected on Mt. Banahao, Luzon, 500 m., on dead timber, May, 1906, by *Elmer,* no. 7556.

Subfamily DAEDALEAE

Daedalea amanitoides Beauv. Fl. Owar. 1: 44. pl. 25. 1804. (Type from Wari.) *Daedalea palisoti Fr.* Syst. 2: 335. 1821. *Lenzites palisoti Fr.* Epicr. 404. 1838. Afzel. Fung. Guin. 1: pl. 11. f. 23. a. b. *Daedalea repanda Pers.; Gaud.* Voy. Freyc. Bot. 168. 1826. (Type from the island of Rawak.) Mont. Cuba 382. pl. 14. f. 4. 1842. *Lenzites repanda Fr.* Epicr. 404. 1838. *Daedalea applanata Kl.* Linnaea 8: 481. 1833. (Type from Mauritius.) *Lenzites applanata Fr.* Epicr. 404. 1838. *Lenzites pallida Berk.* Lond. Jour. Bot. 1: 146. 1842. (Type from Manila.) *Lenzites platypoda Lév.* Bonite Crypt. 1: 184. 1844–1846. Ann. Sci. Nat. Bot. III. 2: 180. 1844. (Type from Manila.)

Luzon: Mt. Mariveles, *Elmer* 6942. Leyte: Palo, *Elmer* 7218.

Daedalea hobsoni Berk. Jour. Linn. Soc. Bot. 13: 165. 1873. (Type from Australia.) *? Trametes colliculosa Berk.* Lond. Jour. Bot. 6: 506. 1847. (Type from Ceylon.)

Luzon: Mt. Mariveles, *Elmer* 6914.

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LEAFLETS OF PHILIPPINE BOTANY

EDITED BY A. D. E. ELMER, A. M.

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A CENTURY OF NEW PLANTS

BY

A. D. E. ELMER.

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PANDANACEAE.

Pandanus martellii n. sp.—Slender erect solitary tree, about 9 m. high; stems hard, 15 cm. in diameter or frequently thicker, unbranched except near the top, covered with smooth yellowish bark and beset with blunt conical spines; prop roots few and comparatively short; branches also few, short, thick and rigid. Leaves closely crowded near the ends of the branches, arranged in spirally twisted rows, the younger ones ascending, the upper one half of the older ones drooping, 15 dm. long or those of the young trees longer, 5 cm. wide, shining dark green on the upper surface, glaucous green beneath, keel of the midrib beneath smooth below the middle, finely scabrid above the middle but especially toward the apex, edges sharply serrate, terminal portion slightly attenuate and extended into a fine apex, leaf blade 3 cm. wide at 2 dm. below the apex. Syncarpia clustered upon a pendulous 5 dm. long peduncle, 3 to 7 in number, descending, 12 to 17 cm. long, about 7 cm. in diameter, equally rounded at both ends, cylindric or frequently a trifle thicker toward the base; receptacle subterete, 10 cm. long, 2 cm. in diameter, odorless; drupes from 60 to 100, yellow when mature, smooth, without odor, confluent below the middle, toward the base compressed and linearly attached to the receptacle, 2.5 to 3 cm. long, about

1.5 cm. in diameter, the upper one half free and conical, irregularly 5 to 7-angled but the edges more rounded and converging toward the truncate greenish apex; stigmas plane, sessile, approximate, 7 to 11, brown, 0.75 mm. in diameter; fertile seeds 7 or more to each drupe.

Type specimen 9083, *A. D. E. Elmer*, Mount Banahao near Lucban, Province of Tayabas, Luzon, January, 1907. This singular species has been observed here and there as isolated trees in well drained soil of light woods and in dense thickets skirting the mountain at 650 meters. Section Vinsonia; Named in honor of *Prof. Ugolino Martelli.*

GRAMINEAE.

Gigantochloa merrilliana n. sp.—Slender trees forming large clusters; stems smooth, green, often appearing glaucous, about 15 cm. thick; branches terete, numerously rebranched, half drooping, very hard and tough. Leaves disticbously arranged along the ultimate twigs, chiefly descending and recurved upon the very short contracted base, slightly paler green beneath or even glaucous, more or less conduplicate on the upper surface, 2 to 3 dm. long, 2 to 4 cm. wide, gradually tapering toward the sharply acuminate apex, base abruptly contracted into a very stout flattened petiole, ovately linear or linearly oblong, about 2 cm. apart, smooth, or only slightly scaberulous, glabrous; the lateral veins obscure, the straw colored midvein quite prominent beneath; leaf sheath smooth, closely fitting the stem and overlapping, well separated toward the apex, glabrous, truncate; mature stem sheaths not observed, but those on the twigs 3 cm. long, glabrous, acuminate, involute, terminated by a 6 mm. long setaceously pointed subdeflexed foliaceous bract; ligule also glabrous, of a rigid axillary membrane 2 mm. wide through the middle and extending from tip to tip of the sheath apices; nodes thickened, ring like. Inflorescence upon special subaxillary slenderly drooping branches usually below the leafy twigs, from 3 to 9 dm. long; these branches are sparingly rebranched and are subtended at the base by many short imbricated tough bracts forming a sort of tube, spikelet bearing from the base, the internodes 1 to 2 cm. long; spikelets 3 to 5-clustered, each cluster alternatingly inserted upon the nodes, sessile, 8 mm. long, 4 mm. wide below the middle, ovately oblong in outline, compressed, somewhat unequal in size, about 6-flowered; empty glumes 2, smaller, otherwise similar to the flowering ones; flowering glume chartaceous, broadly elliptic, deeply concave, 6 mm. long, fully as wide, finely ciliate along the edges, numerously nerved; palea usually 1 mm. shorter, narrowly oblong, densely ciliate along the keels which are 1.5 mm. apart at the middle, minutely bidentate at apex, the thin lateral folds enclosing the stamens and pistils; filaments glabrous, hyaline, a trifle exceeding the palea and its subtending glume, 6, united especially toward the top but easily separating; anthers ultimately exerted, yellow, 3 to 4 mm. long, at least 0.5 mm. thick, linear, pointed at apex, base 2-lobed, basifixed, persistent and twisted after its pollen is shed; ovary subglobose, hairy, 0.75 mm. in diameter; style about 5 mm. in length, hairy, gradually thickened toward the base, brown and twisted at the top and terminated into an acuminate short bristly pubescent stigma.

Type specimen 7283, *A. D. E. Elmer*, Palo, Province of Leyte, Leyte, January, 1906. Tall and graceful, forming forests in deep fertile soil of the Bangon River. Quite common, and its stems are used by the natives for diverse purposes. Distinguished from *G. verticellata Munro* by its shorter foliage which is only one half as wide and with obtusely rounded bases, not narrowly attenuate. Named after *Mr. E. D. Merrill.*

FLAGELLARIACEAE.

Flagellaria philippinensis n. sp.—A looping climber; stems sparingly branched, 12 mm. thick or often thicker, hard, smooth, green. Leaves about 5 cm. apart, rigid, lucid light green on both sides, coriaceous, in 2 divaricate rows, brown when dry, 3 to 5 dm. long, linear lanceolate, gradually tapering to a very slender circinate tendril like point, 4 cm. wide below the middle, the base subtruncate or shortly obtuse, glabrous, its parallel nerves faint and numerous; petiole very short, stout, flattened, strongly twisted; sheaths overlapping, striate, the throat glabrous and entire. Panicle terminal, subpendulous, upon far outreaching branchlets, 5 to 6 dm. long, creamy white, glabrous; branches and branchlets very wiry, smooth, flattened toward the base, branched from below the middle, with brown colored accrescences in the axils, the ultimate branchlets short flexuose and usually subtended by obtuse bracts; flowers usually several clustered toward the end of the peduncles, subsessile, subtended by similar bracts; sepals petaloid, 6, the outer 3 somewhat shorter than the inner ones, ovately oblong, 2.5 mm. long, 1.5 mm. wide near the base, obtuse, persistent, imbricate, obscurely united at the bases, the apical one half hyaline; stamens 6, much exerted; the filaments glabrous, free, subpersistent, flaccid, 4 mm. in length; anthers basifixed, linear, 2 mm. long, 0.5 mm. wide, rounded at the apex, with 2 short spurs at the base; ovary glabrous, 1 mm. long, more or less elongate triangular; style equally as long, also glabrous; the 3 stigmatic arms longer, reflexed and slightly twisted; fruit not seen.

Type specimen 9142. *A. D E. Elmer*, Lucban, Province of Tayabas, Luzon, May, 1907. Foliage and infrutescence twice as large as *F. indica Linn.* and anthers only one half as long as in that species. It was discovered in damp woods climbing lofty trees at 750 meters near the base of Mount Banahao.

COMMELINACEAE.

Pollia philippinensis n. sp.—Erect or reclining herbs, with branched and creeping rootstocks, 1 to 2 m. high. Leaves mostly toward the top, somewhat succulent, smooth on both sides, broadly lanceolate to oblanceolate, 5 dm. long including the much narrowed base, 7 cm. wide, entire, apex tapering into very slender sharp points, base attenuate; finely and inconspicuously parallel nerved, equally plain from both sides, the cross bars beneath faint and very numerous; sheaths of the lower portion of the stem persistent, inflated, 1.5 cm. thick, 3 cm. long, striate, the entire ciliate throat oblique and usually terminating into a short appendage. Infrutescence terminal, usually upon somewhat shorter stems, persistent even after the foliage of the stem disappears, congested, 7 cm. long; peduncle 5 cm. long; strict, obscurely nodose, smooth, about 5 mm. thick; branches 1 cm. long, with ring like nodes, tough, persistent, usually 3 to 5-branched or bearing 3 to 5 pedicels; pedicels strict, at most 5 mm.

in length, persistent, conspicuously enlarged at the apex; fruits ellipsoid, 6 mm. long, about 5 mm. in diameter across the middle, shining, rather dry, bright indigo blue, under a lens minutely pitted, 3-celled; seeds many in each cell, hard, coal black, flattened, irregular in shape, about 2 mm. in diameter or wide, minutely pitted, place of attachment circular and centrally located on one side.

Type specimen 9162, *A. D. E. Elmer*, Lucban, Province of Tayabas, Luzon, May, 1907. In stony soil along creek bottom at 650 meters near the base of Mount Banahao.

MARANTACEAE.

Monophrynium simplex n. sp.—Perennial herbs, 1 to 1.5 m. high, forming loose tufts composed of small individual tuftlets; stems of flowering stalk glabrous, erect, surrounded by 2 to 3 radical leaves which are usually a trifle shorter; leaf petioles also glabrous, at least the lower one half with prominent sheathing margins which snugly conceal the basal portion of the flowering stem, the apical 2 cm. much thickened and only suberect; blade 2 to 3 dm. long, about one half as wide across the middle, base subcuneate, apex tapering into a slender acuminate point, margins entire but while drying strongly curving upon the ventral surface, submembranous, lucid dark green and glabrous above, paler and soft strigose on the nerves beneath, subhorizontal or only slightly ascending; nerves numerous, oblique, parallel; the leaf subtending the inflorescence usually smaller, the basal portion of its petiole similarly sheathed and with a thickened apical portion. Inflorescence simple, 1, 2, 3, or even 4 dm. long, 2 to 3 or even 5-branched from about the middle, the longer branches 2 dm. long, unbranched, grayish or yellowish hairy when young but soon becoming subglabrous, subtended by 2 cm. long marcescent bracts, strict but occasionally obscurely curved between the flower clusters; flowers about 6 in each cluster, 1 to 2 cm. apart, the outer ones deciduous, the middle ones in anthesis, the central in bud, each subtended by a single bract; the entire flower cluster subtended by 1.5 cm. long bract which much exceeds the flowers and imbricately clasping the rachis toward the base; peduncle of the individual flower cluster conspicuously recurved in age, persistent, 1.5

cm. long; pedicels curved, 6 mm. long, slightly thicker toward the apex, 0.75 mm. thick, brown, persistent, soft pubescent; ovary subglobose, densely covered with yellowish gray hairs, separating from the pedicel; calyx subpersistent, of 3 distinct segments, 6 mm. long, equal, nearly 2 mm. wide at the base, gradually tapering toward the rather blunt slightly hirsute tip, conspicuously 7 to 9-carinate; corolla delicate, pale white, 1 to 2 mm. longer than the calyx, united below the middle; the 5 segments membranous, ligulate, irregularly truncate at the slightly callous hirsutulous apex, more or less spotted at the apex; the 2 outer staminodia irregularly obovate, slightly longer than the corolla lobes; the callous staminode petaloid, obliquely truncate, numerously spotted, shorter; cucullate staminode still shorter, quite rigid, with narrow subauriculate lobes; capsule about 8 mm. long, roundly triangular in the perfect ones, base rounded, apex truncate to trisulcate; the thick fleshy exocarp rugose and only a trifle pubescent, pale green when collected, easily splitting into 3 carpels, divided into 3 cells by very thin partitions; stone like seeds 1 in each cell, irregularly angled throughout, 5 mm. long, about 4 mm. thick, smooth, streaked or finely spotted with brown, truncate at both ends, the dorsal ridge prominent and grooved, the lateral edges also prominent, the 2 dorsal sides as well as the 2 ventral sides concave, attached at the base upon a rather thin whitish arile, or the seeds simply 3-sided and with rounded edges and truncate apex.

Type specimen for fruit 7611 and for flower 9147, *A. D. E. Elmer*, Lucban, Province of Tayabas, Luzon, May, 1907. It was associated with *M. fasciculatum* (*Presl*) *K. Schum.* in loose fertile soil of wooded slopes near streams at 750 meters on Mount Banahao. It is a coarser plant and its comparatively simple inflorescence serve to mark it as the second species in the genus.

MORACEAE.

Kadsura philippinensis n. sp.—Subscandent and widely sprawling shrub; branches smooth, slightly ridged, its small lenticels dirty white; old stems 5 cm. thick, the thick bark coarsely checked; the wood red except the yellowish brown outer portion. Leaves alternate, scattered along the twigs.

submembranous, flat, ovately oblong, the average blade 9 cm. long by 5 cm. wide below the middle, entire, glabrous, base rounded, apex also rounded or obtuse or frequently acute; petiole much thickened at base and on each side subtended by small buds, 1 cm. long, glabrous, deeply caniculate along the upper side; nerves very faint, barely distinguishable from the reticulations, 5 to 7 on each side, equally plain on the upper side. Flowers unisexual, subglobose, one half nodding, less than 1 cm. thick; peduncle 5 to 8 cm. long, usually straight, glabrous, with 1 to 3 short bracts, the base subtended by similar bracts, axillary, solitary; sepals and petals imbricate, the outer ones much smaller, reddish, glabrous, rather thick; the inner ones yellow, strongly concave, elliptic, about 6 mm. long; carpels rugose, 1.5 mm. across in the young state, irregular and angular, 2-celled, with a single seed in each cell.

Type specimen 8700, *A. D. E. Elmer*, Baguio, Province of Benguet, Luzon, March, 1907. Scrambling over shrubberies of hot dry ridges of limestone outcroppings near the barrio of Bacong five miles north of Baguio. The Igorrotes call it Betocaan and its slender stems are used for tieing purposes.

Conocephalus warburgii n. sp.—Scandent shrub, with more or less tough wood and smooth grayish bark; branchlets quite slender, not numerously branched, one half drooping, the thickness of a small finger. Leaves chiefly toward the ends of the twigs, very unequal in size, oblong to obovately lanceolate, flat, subcoriaceous, horizontal or somewhat descending, the medium blades 2 dm. long and 6 cm. wide below the middle, the upper one half gradually tapering into an acuminate point, the base rounded, glabrous, finely marked with dull white hair like excrescences; the 7 to 9 pairs of lateral nerves ascending, quite prominent on both sides but especially so beneath; petioles variable in length, from 5 to 10 cm. long, glabrous, thickened at the base, deciduous, leaving large scars; interaxillary bracts erect, glabrous, rigid, purplish within and forming ant tubes, edges twisted and overlapping, 15 mm. long, also deciduous. Infrutescence in the lower leaf axils or from the axils of their scars, about 10 cm. across, glabrous except the puberulent younger portions, didymously rebranched, the branches subtended by vestiges of bracts; the 5 mm. thick heads densely fruited, upon short peduncles; calyx cup elliptic, about 2 mm. long and 1.5 mm. in diameter, glabrous, thick, truncate, purplish; seeds solitary, 2 mm. long, hard, smooth, straw color, oblong but the upper portion much flattened and gradually tapering to the short curved brown tip.

Type specimen 8973, *A. D. E. Elmer*, Baguio, Province of Benguet, Luzon, March, 1907. It climbs tall trees along streamlets between Amukao and Bayabos near Sablan, and its slender roots are used by the Igorrotes in making deer traps in the form of latches or loops. This species which the natives call Anafol is not at all common. Named in honor of *Dr. Otto Warburg* who described two other Philippine species.

Artocarpus leytensis n. sp.—A stocky erect tree, 10 m. high or higher, with a bole 3 dm. in diameter; branches widely spreading, forming an umbrella shaped crown, the ultimate twigs rather thin, smooth and grayish brown. Leaves few at the ends of the twigs only, flat, spreading, subcoriaceous, glabrous above except along the midnerve, shining green, much lighter green beneath and short pubescent, oblong, the lower one half occasionally inequilateral and usually narrowed from above the middle, apex obtuse or acute, the base rounded or only emarginate, the medium sized blades 15 cm. long by 6 cm. wide, the entire margins subinvolute; petioles 1 cm. long, short rusty brown pubescent; nerves 5 to 7 on each side of the midrib, very prominent beneath, ascendingly curved, reticulations also conspicuous. Infrutescence in the leaf axils of the young twigs, subpendulous; peduncles 2 cm. long, fleshy, covered with a short dense umber colored pubescence, longitudinally ridged when dry, gradually thickened toward the apex, usually solitary; fruits obovoid in general outline, but very irregular in shape, ours 2 cm. across, usually only 1 to 5 sections developing into seeds which are partially imbedded upon the 8 mm. thick fleshy corrugated receptacle; each of these sections bearing from 1 to 5 cells enclosing solitary ovules, its outer walls leathery and covered with a short dark brown tomentum; the seeds surrounded by thin scarious membranes, 8 mm. long, ellipsoid or somewhat flattened, light brown, rugose.

Type specimen 7243, *A. D. E. Elmer*, Palo, Province of Leyte, Leyte, January, 1906. In deep fertile soil of light woods at the mouth of the Bangon River near a nipa swamp. It is not to be confused with *A. paloensis Elm*. which aside from the habitat and shrubby nature has differently shaped leaves, and the flower clusters are upon the two year old twigs.

Artocarpus paloensis n. sp.—A shrub, 3 m. high; branches hard, with smooth grayish brown bark, the terminal young portion soft and rusty brown pubescent. Leaves alternate, toward the ends of the twigs, 2 to 3 cm. apart, ovately oblong, soft membranous, the average blades 15 cm. long, 9 cm. wide just below the middle, glabrous above except along the grooves of the midnerve and larger lateral ones, apex rounded or obtuse or frequently acute, base broadly rounded, shallowly cordate, green above, much paler beneath, margins subentire or obscurely undulate; petiole 1.5 cm. long, pubescent; nerves 7 to 9 on each side, ascendingly arched, pubescent, reticulations also pubescent and quite prominent beneath. Flowers clustered in the axils of the leaf scars along the two year old twigs, both sexes intermixed, but the male heads more numerous and upon peduncles only one half as long as those bearing the larger female heads; peduncles fleshy, longitudinally ridged in the dry state, densely covered with a very short chocolate brown tomentum. those bearing the female heads 1 to 2 cm. long, spreading; pistillate heads, obovoid, 6 mm. long, 5 mm. thick above the middle; perianth more or less united into a 0.75 mm. long tube, its appendages minute and very sparsely ciliate; ovary oblong, 0.5 mm. long, flattened, glabrous, 1-ovuled; style also glabrous, 0.25 mm. long, terminated by a short flattened stigma which barely exceeds the perianth; shield like bracts of the male flowers erect, 0.75 mm. long, its terminal rim not large, glabrous; perianth tubular, 0.6 mm. long, truncate or obscurely lobed, glabrous but with a ciliate rim enclosing a single stamen; filament very thick; bearing a short comparatively broad anther; fruits not seen.

Type specimen 7244, *A. D. E. Elmer*, Palo, Province of Leyte, Leyte, January, 1906. A branched shrub in light woods of a dry ridge at 300 meters.

Artocarpus subrotundifolia n. sp.—Large erect tree, 15 m. high; branches spreading, forming a dome shaped crown; the ultimate ones slender, not numerous, horizontally spreading, short brown pubescent at the ends. Leaves usually toward the ends of the twigs, few, scattered, unequal in size and shape, submembranous, flat, lucid green above, much duller beneath, quite rigid, usually glabrous above except the yellowish tomentum along the midnerve and lateral nerves, the medium sized blades 3 dm. long, 1.5 dm. wide across the middle, margins subentire or irregularly undulate and involute, apex rounded and terminated by a short acute point or acumen, base rounded or frequently emarginate, the smaller ones orbicular, the normal one broadly oblong or subrotund, petiole about 2 cm. long, when young with a dense rusty brown pubescence; nerves very prominent beneath, brown when dry, 9 to 13 pairs, subdivaricate, their tips submarginally interarching, covered with a soft sparse pubescence; cross bars one half as prominent, reticulations quite conspicuous beneath, similarly pubescent. Inflorescence in the leaf axils or in the axils of leaf scars, upon stout very thick densely pubescent peduncles; the pistillate usually in the upper axils, solid, ellipsoid or obovoid, green, 15 mm. long, 12 mm. in diameter above the middle; perianth tubular, narrowed toward the base, 1.5 mm. long, terminated by short broad densely ciliate appendages; ovary elongated, flattened, 1 mm. long, glabrous, with a single pendulous ovulule; style 0.5 mm. long, glabrous stigma thicker and darker brown in the dry state, flattened, characteristically recurved, grooved along the upper side, at least 1 mm. in length; male flowers chiefly along the branchlets, pale yellow, spongy, unequal in size and shape, egg shaped or ellipsoid, the average ones 3.5 mm. in diameter, early falling; perianth segments 3, falsely united, 0.75 mm. long, subglabrous or ciliate along the upper margins, the tips closely overarching the stamens; filament very broad at the base, 0.3 mm. long; anther basifixed, 0.2 mm. long, elliptic; between the staminate flowers are erect shield like bracts exceeding the perianth and densely ciliate around the flat rim.

Type specimen 7265, *A. D. E. Elmer*, Palo, Province of Leyte, Leyte, January, 1906. A well appearing tree scattered in the woods in the fertile valley of the Bangon River.

Ficus merrillii n. sp.—Slender tree, 8 m. high; stems 15 cm. thick, with soft white wood, brown bark; branches smooth, yellowish gray, slender, suberect. Leaves submembranous, dark green above, flat, spreading from the ends of the branchlets, very unequal in size, 2 to 4 cm. apart, glabrous, the medium ones 2 dm. long by 1 dm. wide across the middle or just above this, obovate, the apex short and abruptly acuminate, the base acute or attenuate, the margins subentire or obscurely dentate to crenulate to undulate; lateral nerves 5 to 7 on each side, ascending, brown, prominent beneath, interarching near the edge, cross bars much finer; petioles at least 1 cm. long, when young short brown pubescent, ultimately turning glabrous, stout; bud scale 15 mm. long, sharply acuminate, short rufous brown pubescent on the exterior.

Receptacles upon comparatively fine numerously branched woody descending tubercles 3 to 6 dm. long and arranged along the lower one half of the stems only, 1 to 3-clustered, subglobose or obscurely obovoid, 8 mm. in diameter, short dark brown pubescent; peduncles about 1 cm. long, yellowish pubescent, usually recurved and spreading, thickened toward the apex and bearing 3 small bracts; umbilicus slightly raised, its bracts broad; gall and male flowers only; the staminate ones rather few, immediately beneath the umbilical scales, monandrous; the perianth a trifle longer than 1 mm., enclosing the stamen in the early stages but ultimately divided into segments; anther 0.75 mm. long, elliptic to oblong upon a 0.25 mm. long filament; gall flowers 2.5 mm. long, glabrous, upon a 1.5 mm. long slender pedicel, obovoid, the median line nearly straight, base tapering, apex rounded, 0.75 mm. thick; the oblique style sublateral, 0.25 mm. long, bearing a slightly thickened oblique disc like stigma; the inner surface of the syconium covered with yellowish brown bristle like 1 mm. long hairs.

Type specimen 8986, *A. D. E. Elmer*, Baguio, Province of Benguet, Luzon, March, 1907. Very rare in low but well shaded ravines just below the barrio of Irisan which is about 3 miles west of Baguio. The Igorrotes call it Dewdu. Its nearest relatives are *F. ribes Reinw.* and *F. miguelii King*, but it is distinct from either. Named after *Mr. E. D. Merrill.*

Pseudopalma n. sect.—Strict unbranched or palm like shrubs. Leaves large, subsessile, smooth. Receptacles comparatively large, axillary; flowers unisexual; the male and gall flowers in one set of receptacles, the fertile female in another; stamens 2, without pistil, subtended by broad perianth segments; segments subtending the fertile and gall flowers setaceously acuminate.

This new section of the genus *Ficus* includes two endemic Philippine forms and the following proposed new species.

Ficus blancoi n. sp.—*F. pseudopalma Blco.* in *Elmer's* Leaf. Philip. Bot. 1; 202, 1906.—Slender erect palmlike shrub, 2 to 3 m. high; stem about 3 cm. in diameter, covered with smooth grayish white bark. Leaves crowded at the top of the stems, subwhorled, 2 to 3 cm. apart, slightly ascending, radially spreading; petiole scurfy brown, thick, 5 to 8 mm. long; blade more or less unequal in size, glabrous, shining and bottle green on the upper surface, yellowish green beneath, subscarious, 8 dm. long or less, 2 dm. wide above the middle, obovate to oblanceolate in outline, apex rounded or obtuse, base cuneate, ultimately decurrent and terminated by short rounded or truncate lobes; margin very coarse and jagged, prominently undulate to sinosely serrate or toothed; midvein very stout and prominent beneath; the lateral ones 7 to 9 on each side, slightly ascending, divaricately forked above the middle; reticulations numerous, whitish, but much less prominent; bud scales brown, membranous, caducous, 3 cm. long, glabrous, acuminate, about 8 mm. wide at the base.

Receptacles normally 2, from the leaf axils, subtended by persistent bracts; peduncle 6 mm. long, erect when young, but finally reflexed between the stem and the leaf petiole; syconium shining smooth, purplish or wine color, bearing a few lighter colored lenticels, broadly rounded at the base, 2.5 cm. long, 1.5 cm. thick, ellipsoid, not compressed nor twisted; the apex truncately conical, the upper one half of the fruit much thickened and hardened by coarse irregular vertical ridges which ultimately terminate into very thick and hard umbilical scales; flowers male and gall; staminate ones concealed by the inner umbilical scales; the perianth scales completely enveloping the 2 stamens, brown, oblong to subelliptic, obtuse, about 3 in number and much overlapping, 2 mm. long; anthers subsessile, oblong, 1.25 mm. long, 0.75 mm. broad; gall flowers upon 1 mm. long stipe, 4 mm. long, obovoid, nearly 2 mm. in diameter, brown, smooth, subtended by 3 to 5 unequal and irregularly shaped setose or acuminate 1 to 2 mm. long perianth segments; style lateral. 0.5 mm. long, dark brown, shorter than the ovary; stigmatic portion nearly as long, thicker, lighter in color.

Type specimen, 7342, *A. D. E. Elmer*, Palo, Province of Leyte, Leyte, January, 1906. When the Fascicle of East Leyte Figs was written the writer took for granted that 7342 was *F. pseudopalma Blco.* but later observations in the field led me to believe there exists two species. For good reasons the Luzon plant can be accepted as typical of *Blanco's* species. The Leyte species here segregated has stems and figs only one half as large; its fruits are not subcompressed nor twisted. Named in honor of the celebrated botanist, *M. Blanco.*

URTICACEAE.

Procris pseudostrigosa n. sp.—A laxly branched tree like shrub, 3 m. high; branches more or less flexible, brown, the ultimate ones full of sap. Leaves thin, chiefly at the ends of the twigs, flat, subopposed by rigid brown bracts, oblong to oblanceolate, margins entire, subinequilateral especially toward the base, apex abruptly acute, base obtuse, 14 cm long, 2.5 cm. wide, strigosely marked but not pubescent; the 7 to 9 nerves scurfy rusty brown beneath; petiole 8 mm. long, also scurfy brown, caniculate on the upper side, subtended by 3 to 5 mm. long acute stipules. Inflorescence cymosely paniculate, lateral upon the stem, 4 cm. long, sometimes wider, scurfy brown; flowers dirty white, usually clustered at the ends of the dichotemous branchlets, sessile, staminate; perianth petaloid, united only at the base, transparent, 3 mm. long, oblong to obovate, 5 in number; stamens 5, opposite the segments; the filaments glabrous, with hyaline margins, inserted at the middle of the petaloidea and exceeding them, the upper one half strongly inflexed; anthers basifixed, 1.5 mm. long, 1 mm. wide, the base acutely lobed, the sacs bursting along the lateral edges; pistillate flowers and fruits not seen.

Type specimen 7500, *A. D. E. Elmer*, Lucban, Province of Tayabas, Luzon, May, 1906. On wooded ridges of Mount Banahao at 900 meters. It was seen only once and there is some doubt as to the right genus.

Elatostema viridescens n. sp.—Herbs, 2 to 5 dm. high; stems green, smooth. Leaves alternate, not bract like leaf opposed, distichous, divaricate, usually subfalcate, sessile, unequal, membranous or the younger ones flaccid, the normal blades 15 cm. long and 3 cm. wide, lanceolate, tips slenderly acuminate, bases subcuneate and unequally sided, glabrous, strigosely marked, viridescent but the upper surface somewhat darker, margins entire below the middle, coarsely and serrately toothed from the middle toward the apex; nerves prominent beneath, 3 from near the base, each lateral one connected with the strong midrib by 4 to 6 cross bars. Involucre subtending the male flowers glabrous, viridescent green, obscurely flattened, hyaline margined, confluent, 12 mm. broad, each bract abruptly terminated into an inrolled acuminate point; staminate flowers clustered, some sessile, others distinctly pedicelled; stamens sessile, 4, included by the hyaline 2 mm. long sepals, the subtending more or less hyaline bracts with a green midvein and delicately ciliate.

Type specimen 8076, *A. D. E. Elmer*, Los Baños, Province of Laguna, Luzon, April, 1906.

Elatostema microphyllum n. sp.—A subcaespitose herb, with slender sparingly branched 3 to 7 cm. long stems which when young are short strigose. Leaves distichous, alternate, 2 mm. apart, divaricate or only a trifle ascending, very thin, dull green above, subglaucous green beneath, drying green, oblong to obovate or obliquely cuneate, margins below the base entire, prominently dentate toward the apex, 8 mm. long, 3 mm. wide immediately above the middle, occasionally smaller, apex obtusely rounded, base cuneate and inequilateral, subsessile; the upper lateral side with only 1 basal nerve running nearly parallel with the margin; the opposite side with 5 nerves, the basal one subparallel with the margin; the second and third oblique and arising from the midvein above the middle of the blade; stipule ovate, 0.5 mm. long, comparatively thick. Infloresence sessile, very dense, elongated, ascending from the leaf axils, not exceeding 3 mm. in length, greenish; bracts sparsely strigose, 3 to 5-lobed, spreading, the lobes obtuse to acute and 1.5 mm. in length; perianth of flowers equalling the bracts, linear, apex obliquely truncate, green, conspicuously ciliate, united around the base of the short pedicel; ovary glabrous, hyaline, 0.75 mm. in length, fusiform, apex bearing a comparatively large capitate stigma; perianth lacking.

Type specimen 9149, *A. D. E. Elmer*, Lucban, Province of Tayabas, Luzon, May, 1907. A most dainty species of this group of plants, forming handsome tufts upon moss covered rock in stream beds of ravines at 700 meters on Mount Banahao. Not infrequently the foliage reminds one of depauperate forms of *E. podophyllum Wedd.*

Elatostema pinnatinervia n. sp.—Tufted, suberect or the outer stems subdecumbent, from 5 to 25 cm. high; stems rather thick, very sparingly branched, finely tubercled or scurfy. Leaves submembranous, drying green, distichous, alternate, 1 cm. apart, divaricate, obovately oblong, 2.5 cm. long, 1.5 cm. wide just above the middle, but frequently much smaller especially toward the base of the stems, apex rounded, base subcuneate and rather abruptly rounded, subsessile, edges coarsely and deeply dentate, glabrous except the nerves beneath, paler green beneath; nerves conspicuous beneath, nearly parallel, slightly ascending, strict, terminating in the apex of the teeth, with dirty yellowish brown hispidulous hairs, reticulations obsolete; stipule caducous, 3 mm. in length, hyaline sides, the 2 nerves extended into bristle like points. Inflorescence a very dense flattened cluster, frequently 5 mm. across, in the leaf axils and usually extended over the upper surface of the stem; subtending bracts spreading, as large as the cluster, the basal one half united, foliaceous, its segments linear and numerous; pistillate flowers subsessile, surrounded by several linear sparingly ciliate involucral bracts about 1.5 mm. long and which are more or less united at the base or around the short pedicel; perianth absent but the base of the ovary thickened; ovary fusiform, brown, short stipitate at the base, glabrous and more or less dotted, apex with a hyaline point.

Type specimen 9193, *A. D. E. Elmer*, Lucban, Province of Tayabas, Luzon, May, 1907. A very pretty *Elatostema*, commonly found on moss covered rocks scattered in stream beds of wooded ravines at 750 meters on Mount Banahao. It is at a glance distinguished from *E. obovatum Wedd.* by its different venation.

Elatostema laciniatum n. sp.—A very succulent loosely tufted herb; stems soft, green, suberect or reclining, sparingly branched, the longer ones 1 m. long, but frequently much smaller. Leaves usually opposed by very small lamina, extremely diverse in size and shape, glabrous, succulent and soft, glossy and deep green on the upper surface, conspicuously whitish green beneath, nearly black when dry, mostly with inequilateral sides, apex slenderly acuminate or subcaudate, base obliquely subcuneate; the smaller ones bract like, linear lanceolate and entire; the larger blades 16 cm. long, about 5 cm. wide, entire below the middle, coarsely dentate above the middle, oblong to broadly oblanceolate; petiole less than 1 cm. long, glabrous; nerves quite evident beneath; the main nerves 5 to 7 or even 9 on each side of the large midvein, curved and very oblique, reticulations coarse and very obscure in the smaller leaves. Glomerate inflorescence 1 to 2 cm. across, in the axils of the leaves along the middle of the larger stems, few and very loosely flowered, sessile, glabrous; pedicels 1 to 3 mm. in length, slender, subtended at the base by two series of numerous persistent bracts, the larger series linear to spatulate and about 3 mm. long, the smaller series laciniate and 1 to 2 mm. in length only; involucral bracts subtending the flowers nearly free but distinctly united at the base, 5 in number, membranous, brown when dry, oblong, the midvein conspicuous, the finely reticulate sides inwardly folded, each provided with a 3 to 4 mm. long slender tail inserted upon the back just below the rounded apex; perianth of 5 segments, separately inserted upon the base of the united basal portion of the involucre, 1 mm. long, coriaceous, subtruncate, glabrous; young seeds sessile, easily detached, sublenticular, slightly more pointed toward the apex, glabrous, reticulate, brown, 1.5 mm. wide.

Type specimen 9196, *A. D. E. Elmer*, Lucban, Province of Tayabas, Luzon, May, 1907. Exceedingly variable in size, either upon gravelly soil or upon nearly decayed stumps and logs in deep woods along water courses at 700 meters on Mount Banahao. As far as known it extends from our region southward to the Island of Samar. Probably nearest related to *E. nigrescens Mig.* but the receptacles of our specimen are not pedunculate.

LORANTHACEAE.

Loranthus banahaensis n. sp.—Epiphytic, forming more or less rigid tangled bushes, its host swollen where attached; branchlets rigid, crooked, rather sparse, breaking with a snap; bark smooth, yellowish, certain portions quite conspicuously brown colored, lenticelled. Leaves usually curved upon its upper lucid green side, beneath light almost sulphur yellowish green, glabrous, very thick and rigid, obovate to subelliptic, apex rounded, base acute to subcuneate, opposite to subopposed, margins entire, the average ones 10 cm. long, only one half as wide; petiole thick, deciduous, 1 to 2 cm. in length, also glabrous; midvein prominent especially toward the base, dark brown, the 5 to 7 ascending lateral nerves very obscure. Flowers in dense sessile clusters, in the leaf axils or frequently between the bases of the leaf petioles; the conspicuous conically rounded buds covered with a greenish gray calyptrate hood which soon falls off; flowers sessile, fleshy, all erect and parallel, each small cluster of 9 flowers subtended by glabrous broadly rounded involucral bracts; ovaries leaving conspicuous circular scars after falling, green when collected, at most puberulent, the young fruits elongated ellipsoid, obscurely angled and ridged; calyx persistent, rim like, very minute; corolla orange red at the base, dull yellow in the middle, with purplish or nearly black tips; the thick ligulate segments 4 in number, 15 mm. long ultimately, the basal 2 mm. united, the apical 3 mm. becoming reflexed, glabrous or very short puberulous toward the apex on the exterior, very gradually tapering from base to the blunt apex; stamens opposite the lobes, 4; filaments short, attached a trifle below the throat, thick and triangular; anthers versatile, linear, 3 mm. in length, acute at both ends; style terete, 0.75 mm. thick, fleshy, glabrous, barely exceeding the stamens, terminated by a capitate stigma.

Type specimen 9115, *A. D. E. Elmer*, Lucban, Province of Tayabas, Luzon, May, 1907. Rare in woods at 750 meters on Mount Banahao. Closely related to *L. halconensis Merr.*, but the inflorescence of our specimen is involucrate, the individual flowers sessile and only 4-merous.

POLYGONACEAE.

Polygonum mearnsii n. sp.—Annual or biennial herbs, finely and numerously branched, stems very slender, glabrous; nodes surrounded by thin brown setose bracts, which are 3 to 5 mm. long including the straight hairs. Leaves mostly toward the ends of the branchlets, linear lanceolate, 2 to 4 cm. long, 3 to 5 mm. wide, apex slenderly acuminate, usually subfalcate, base acute or acuminate, very thin, flat, lighter green beneath, margins and both sides sparsely covered with yellowish setose adpressed hairs; true petiole none or very short; stipules longer and with longer setae than those remaining on the nodes of the stem. Inflorescence terminal, suberect, unbranched, 3 to 5 cm. long including the very slender peduncle; bracts surrounding each individual flower 4 mm. long, thin, the nerves extended into 1.5 mm. long setae; pedicels shorter than the bracts, 1 to 2-flowered, 3 mm. long, surrounded by an equally long, very thin involucre; perianth whitish or frequently with a tinge of pink, 5; the segments oblong, obtuse, about 3 mm. long; stamens about 10, inserted upon the perianth near the base, a little more than one half as long, glabrous, with curved tips; anthers unequal and widely parted, the tips equally pointed, 0.5 mm. long, attached by a minute ventral connective; ovary glabrous, ovoid, 1 mm. long; style equally as long, smooth, tripartate; stigma knob like; mature achene shining black, triangular, rounded at the base, 2 mm. long, 1.3 mm. wide.

Type specimen, 8357, *A. D. E. Elmer*, Baguio, Province of Benguet, Luzon, March, 1907. Trailing and forming loose masses in various species of grasses and sedges on Mount Santo Tomas at 2250 meters. Named in honor of *Maj. E. A. Mearns*, surgeon in the United States Army.

ANONACEAE.

Artabotrys luteus n. sp.—A shrubby climber, well interlacing the shrubs and small trees upon which it climbs; branches many, wiry, the twigs green and covered with minute lenticels; the stem 3 to 5 cm. thick, hard, with smooth gray bark. Leaves chartaceous, nearly equally green on both sides, conduplicate on the upper surface, alternatingly scattered along the very slender twigs, 12 cm. long, 4 cm. wide, but frequently smaller, glabrous, narrowly oblong to lanceolate, apex acute to acuminate, base cuneate, margins entire; petiole 3 mm. long, glabrous, deciduous; veins more conspicuous on the upper surface, 7 to 9 on each side of the prominent midvein, the reticulations also more evident on the upper surface. Inflorescence usually on the slender leaf bearing branchlets; peduncle very rigid, woody, flattened, half drooping, recurved or hooked, about 2 cm. long, usually provided with 1 or 2 short shoots, strigose but soon becoming glabrous; pedicels pendulous, 2 cm. long, yellowish strigose, subtended at the base by minute bracts, thickened toward the apex; calyx persistent, 3-segmented, short, yellowish pubescent or strigose on the outer side, ultimately reflexed, oblong to ligulate, 5 mm. long, at least 2 mm. wide near the base, obtuse at the apex; outer series of 3 petals, oblong, 2 cm. long, 1 cm. wide across the middle, obtuse, nearly equally tapering to both ends, leathery, green but lemon colored when in anthesis, base not constricted and nearly plane, with a semilunar cushion near the base on the ventral side, free; the inner whorl of 3 petals equal in length and similar in texture and pubescence, narrower, lanceolate, the blade equally tapering toward both ends, the basal 5 mm. united but free at the very base, forming a kind of hood over the stamens and pistils; stamens indefinite, caducous, smooth, pink, curved, the connective much flattened and truncately rounded at the apex, subcuneate, nearly 2 mm. long; anthers along the dorsal edges, extending nearly to the base; ovaries whitish, persistent, canescent, 1.5 mm. long, from 5 to 7, terminated by a short glabrous brown colored style; fruit not seen.

Type specimen 9136, *A. D. E. Elmer*, Lucban, Province of Tayabas, Luzon, May, 1907. Apparently nearest related to *A. cumingianus Vid.*, but the smaller less pubescent flowers and the slenderer pedicels at once mark it as distinct.

Polyalthia grandifolia n. sp.—A lax sparingly branched shrub, 3 m. high; bark of branches gray, shallowly ridged, that on the twigs densely covered with a yellowish tomentum. Leaves rather few, flat, membranous and subscarious, 2 to 3 dm. long, 1 dm. wide, dark green and glabrous above except the pubescent midrib, much paler beneath at least in the dry state and subglabrous, apex acuminate, base obtuse or rounded, broadly oblong; nerves pinnate, 15 to 19 pairs, very prominent beneath, ascendingly curved, their apices gradually reduced to the faint articulations, sparsely pubescent; petiole thick, 5 mm. long, densely pubescent with olivaceous hairs; peduncle 8 mm. long, about 5 mm. thick, soft pubescent; calyx evidently very thick; receptacle subconic, 1 cm. thick, densely pubescent; young carpels covered with a dense soft ashy colored pubescence as is also the short stout pedicel, subellipsoid, 12 mm. long, 8 mm. thick, more tapering toward the apex; seed apparently only one in each carpel, caryopsis like, 7 mm. long, 3 mm. in diameter, nearly black, rugose, sublaterally attached near the base.

Type specimen 7358, *A. D. E. Elmer*, Palo, Province of Leyte, Leyte, January, 1906. An undershrub in forested ravines at 330 meters. Very rare. Not having observed the flowers, there remains some doubt as to the proper genus. Its habitat and the foliage strongly resembles *Uvaria alba Merr.*

Polyalthia reticulata n. sp.—Erect shrub, about 2 m. high; branches few and divaricate from the stem, horizontally spreading, quite rigid and thick; bark checked and lenticelled. Leaves divaricate and similarly spreading, chiefly toward the ends of the twigs, 3 cm. long, 6 cm. wide, scarious but rigid, narrowly oblong or lanceolate, gradually tapering toward the apex into an acuminate point, base obtuse, obliquely auriculate, glabrous, darker green above; petiole proper 3 mm. long, but the 5 mm. thick brown glabrous portion about 1 cm. in length; lateral nerves about 18 on each side, reticulately united some distance below the margin, usually alternating with quite prominent secondary ones, reticulations also prominent, midrib very conspicuous beneath and caniculate above; peduncles lateral along the branches, pendulous, very slender and glabrous, 5 to 9 cm. long, 1 to 3- clustered or only solitary from the axils of the leaf scars, persistent, subtended at the base by a dense tuft of rufous colored hairs; flowers purplish, pendulous, thick and rigid; calyx of 3 segments, persistent, the lobes triangularly acute, 4 mm. long; corolla not conniving, straight, or only at the base somewhat concave, of 6 equal segments, the lower one fourth united, about 14 mm. long, usually a trifle constricted toward the base or subpandurate; the lobes strap like, obtuse, 4 mm. wide, granular; stamens very numerous, 1.5 mm. long, gradually tapering from the base; filaments flattened and with hyaline margins, the anthers concealed by the thick and oblique overlapping connectives.

Type specimen 7272, *A. D. E. Elmer*, Palo, Province of Leyte, Leyte, January, 1906. A fine erect tree like under shrub on stream banks of very humid wooded ravines. Rare.

Uvaria zschokkei n. sp.—Scandent by loops, its tough rather flexible branches forming tangled masses over the tops of thickets; stems 2 cm. thick, with white wood covered with smooth brown or mottled bark. Leaves submembranous, lighter green beneath, maroon when dry, glabrous or sprinkled with a short stellate pubescence, oblong to obovate, the smaller subelliptic, apex abruptly acute, base rounded, alternatingly scattered along the twigs, the medium sized blades 12 cm. long, 5 cm. wide, margins entire; petiole 5 mm. long, much thickened, stellately pubescent as are also the young apical portions of the twigs; nerves 9 to 12 pairs, oblique, submarginally united, very prominent beneath, reticulations faint. Inflorescence terminal, the individual flowers subpendulous, 2 to 5 cm. long, from 1 to 3-flowered, densely pubescent with rusty brown stellate hairs; peduncles and pedicels provided with short bracts; calyx rigid, 10 mm. wide, united, subtruncate or obscurely 3-lobed corolla in the bud imbricate, 6-segmented, very deep dull red, spreading, with rigid tips incurved, very short pubescent, obovate, the constricted bases of the segments united, 15 mm. long, about 1 cm. wide above the middle, broadly rounded at the apex; stamens glabrous, indefinite, rigid, curved, gradually tapering from the base, about 5 mm. in length, the connective nearly 2 mm. long, tapering from the apex of the lateral anthers and with an oblique point; ovaries also indefinite, about 5 mm. long, gradually tapering from the base, reddish brown tomentose, apical portion 1 mm. long, very thick, its apex sulcately truncate; fruits not seen.

Type specimen 7647, *A. D. E. Elmer*, Lucban, Province of Tayabas, Luzon, May, 1907. Approximate altitude 750 meters near Mount Banahao. *U. larep Miq.*, but with peduncle terminal or leaf opposed and with much smaller flowers. The author also collected it at Sorsogon, Province of Sorsogon, Luzon. Named after *Mr Theo. C. Zschokke.*

Oxymitra lagunensis n. sp.—Apparently a subscandent herb; branchlets tough, terete, brown, the young twigs ferruginously pubescent. Leaves alternate, variable, green and glabrous above except the midvein, beneath glaucous and with a very short brown pubescence, oblong, 15 cm. long, 6 cm. wide across the middle, apex obtuse or rounded, subcordate at base or frequently only emarginate; pinnate nerves 11 to 13 pairs, more or less crowded from the base, ascendingly arched and apices connected, conspicuous beneath, its cross bars faint but numerous; petiole stout, 5 mm. long, ferruginous pubescent. Flowers terminal, lateral or axillary, pendulous, upon 3 to 5 cm. long dark rusty brown pubescent peduncles which bear a single bract toward the base; calyx persistent, rigid, brown felty pubescent, spreading, its 3 segments triangularly acute, 5 mm. long and nearly as wide at the base; outer 3 petals concave at the base only, linear lanceolate, 13 mm. wide at the base, about 9 cm. long, gradually tapering from the rounded base, leathery, short brown pubescent on the outer side, rugose on the inner side, the inner base with 2 pubescent blotches; inner 3 petals about 3 cm. long, the outer base and the inner surface rugose and glabrous, the middle back yellowish pubescent, thick, very concave at the base and 5 mm. wide, the upper three fourths linearly falsely united and tapering to a sharp point; stamens numerous, about 2 mm. long, oblique and subtruncate at apex; ovaries also numerous, oblong, densely covered with yellowish brown ciliate hairs, 2 mm. long; style clavate, usually curved, 1.5 mm. long; immature fruits were observed to be about 1 cm. long, ellipsoid, upon equally long rather thick pubescent pedicels, with prominent apical points.

Type specimen 9421, *A. D. E. Elmer*, Los Baños, Province of Laguna, April, 1906. Evidently most closely related to *O. filipes Hk.* and *Th.*, but with petals twice the size and with a differently shaped style and stigma. A more distant relative is *O. glauca Hk.* and *Th.*

Oxymitra obtusifolia n. sp.—Subscandent shrub, 2 to 3 m. high, sprawling; wood very hard and tough; bark of the branchlets finely checked, brown, the tips of the twigs short dark brown pubescent but soon becoming glabrous. Leaves submembranous, glaucescent beneath, glabrous above except along the caniculate midrib, elliptic or cuneate to abovate, the normal blades 13 cm. long and 8 cm. wide, rounded or only with a very short blunt point, base also rounded or emarginate, margins entire and inclined to roll upon the upper surface; petiole at least 6 mm. long, thick, rigidly recurved, dark brown pubescent; nerves rather straight and much ascending, submarginally interarched, 7 to 9 on each side, prominent beneath, rusty brown pubescent as are also the faint but numerous cross bars; peduncles lateral, 3 to 4 cm. long, stout, glabrous, usually with a single small bract at the middle, thickened toward the distal end; receptacle slightly hairy, subglobose, 7 mm. in diameter; carpels numerous, the immature ones subglaucous green, the exocarp granular, the endocarp smooth and straw colored, turning yellow and finally becoming red, oblong to ellipsoid, 1 cm. long, 7 mm. thick but frequently a trifle thicker above the middle, nearly equally tapering at both ends, the apex mucronulate and brown pubescent; pedicels slender, puberulous, averaging 1 cm. in length; seeds numerous, much flattened, chiefly attached to a central placentae.

Type specimen 9423 *A. D. E. Elmer*, Palo, Province of Leyte, Leyte, January, 1906. Scrambling amongst and sprawling over shrubbery on hot dry hills. Its numerously seeded larger fruits at once distinguish it from *O. cuneifolia Miq.* Judging from fruits and leaves alone it is closely related to *O. lagunensis Elm.* which however has larger more numerously nerved and differently shaped leaves; pedicels much stouter and pubescent, and with much larger apical points of the carpels.

LAURACEAE.

Persea sterculioides n. sp.—Tree, 7 m. high, with widely spreading branches and with suberect foliage bearing twigs; wood soft, yellowish white; bark yellowish gray, smooth, or when old finely checked. Leaves subcoriaceous, shining above, crowded in subwhorls at the ends of the twigs, gracefully curved, shining green above, much paler or subglaucous green beneath and soft ferruginous pubescent, obovate to oblanceolate, the average blades 18 cm. long and 8 cm. wide above the middle, edges entire, apex acute to acuminate, the basal one half attenuate or slenderly cuneate, persistent, petiole 1 to 2 cm. long, thickened toward the base, reddish brown tomentose; nerves conspicuous beneath, very oblique, 9 to 11 on each side of the very thick midvein, the upper ones strongly curved, the cross bars quite evident. Inflorescence subterminal, shorter than the foliage; peduncle usually from 3 to 5 on each twig, spreading, mostly curved, short brown pubescent, 6 to 10 cm. long, only toward the apex short paniculately branched; secondary peduncles strict, ascending, similarly pubescent, subcompressed, pedicels 2 to 4 mm. long, subtended by ciliate vestiges of bracts; flowers few, early falling, yellowish green, suberect; calyx cinereous pubescent on both sides at the base, 3-lobed; the lobes rather thick, oblong, roundly obtuse, parallel nerved, 4 mm. long, about 3 mm. wide; the inner 3 segments similar but a trifle larger and the lobes nearly free; fertile stamens 9, in several series, strict, not exceeding the inner calyx segments, all inserted upon the base of the calyx; filaments subequal in length, 2.5 mm. long, subcompressed, fleshy, sparsely pubescent; anthers broadly ovate, 1 mm. wide across the base, 1.25 mm. long at most, basifixed, all introrse except the outer or third series which is extrorse, 4-celled, the upper pair of cells smaller, slightly oblique or subparallel, opening by lids which suspend from the upper end; staminodae about 9, the inner ones introrse, the outer ones extrorse, unequal in length, their short filaments similar, the apex broadly subcordate, terminated with a sharp point; ovary subglobose to short obovoid, closely surrounded by the inner whorl of staminodae, at least 1 mm. in diameter, sessile; style glabrous, 2 mm. long; stigma irregularly lobed; fruit not seen.

Type specimen 9121, *A. D. E. Elmer*, Lucban, Province of Tayabas, Luzon, May, 1907. In light open woods or shrubberies bordering the Botocan River at 500 meters. This same species has several times been collected in Mindoro.

ROSACEAE.

Rubus benguetensis n. sp.—Sprawling or subscandent; stems quite rigid and numerously provided with sharp prickles; branches brown, pubescent, also prickly. Leaves scattered along the branchlets, flat, rigidly spreading, ovate, 10 cm. long, one half as wide toward the base, frequently smaller, glabrous except along the nerves, apex obtuse or acute, base shallowly cordate, margin finely serrate; nerves 5 to 7 on each side, much ascending, the midrib usually prickly; petiole about 2 cm. long, prickly and yellowish brown pubescent; stipules 1 cm. long, lanceolate, densely pubescent on the outer side, edges usually rolled in over the subglabrous ventral side. Paniculate inflorescence terminating the branchlets, 1 to 2 dm. long, one half as much across; branches divaricate, pubescent, the larger ones prickly; pedicels as well as the branchlets subtended by bracts, about 5 mm. long, densely covered with a yellowish gray tomentum, flexuose: calyx 12 mm. long, tomentose on the outer side, united at the base, the 5 segments slightly unequal in width, sharply acuminate, rather thick and nerved; flowers usually 3-clustered, apetalous; stamens numerous, 6 mm. long, inserted upon the calyx rim; filaments glabrous, straight, subequal, sharply pointed; anthers 0.75 mm. long, nearly as wide, basifixed; carpels glabrous, subtended by numerous light yellow hairs; styles also glabrous, 4 mm. long, the stigmatic apex only slightly thickened; berries flat, few seeded, shining, nearly black.

Type specimen 8383, *A. D. E. Elmer*, Baguio, Province of Benguet, Luzon, March, 1907. It is rather common in the limestone formation of the pine region about Baguio, and is the only apetalous species known from the Philippines. The Igorrotes call it Kobat.

CONNARACEAE.

Connarus subinequifolius n. sp.—Scandent, numerously branched; stems terete, 2.5 cm. thick, tightly lacing the stems of its support; wood tough; younger bark reddish brown and densely covered with large lenticels, more or less smooth and becoming mottled on the old stems. Leaves flat, submembranous, dark green above, paler beneath, alternate, 1 to 3 dm. long, 3-jugate and imparipinnate, the lower ones smaller; peduncles 9 cm. long to the first pair of leaflets, glabrous, much thickened at the base; the rachis subglabrous, usually 1 cm. extended beyond the upper pair of leaflets and bearing a single large leaflet; petiole 8 mm. thick, subglabrous; the leaflets subopposite, oblong, subequal, the average ones 12 cm. long and 4.5 cm. wide across the middle, nearly equally rounded toward both ends, the apex with a very short obtuse or acute point, base rounded or short obtuse, flat, glabrous above, short brown pubescent beneath; lateral nerves 4 to 6 on a side, prominent beneath, oblique, its reticulations faint beneath. Infrutescence paniculate, terminal or upon special lateral branches, subpendulous, 3 to 9 dm. in length, the ultimate branchlets bearing the fruits, ferruginous pubescent; capsules hard, greenish, half ligneous, covered with a reddish brown tomentum, but ultimately becoming glabrous, without transverse oblique or longitudinal striate markings, the interior covered with a dense brown tomentum, obovoid from the side view, 5 cm. long, 3.5 cm. wide above the middle, the base attenuate into a short pedicel, 2.5 cm. thick below the middle, narrowed toward the subtruncate rounded apex; seed apparently immature, oblong, with a basal caruncle.

Type specimen 9422, *A. D. E. Elmer*, Lucban, Province of Tayabas, Luzon, May, 1907. A rare sprawling shrub in the thickets at 850 meters on Mount Banahao. It has previously been collected by the writer at Sablan, Province of Benguet, Luzon.

BURSERACEAE.

Scutinanthe engleri n. sp.—Tree, 15 m. high, with a broad round top; main branches erect, the ultimate rather numerous and horizontally spreading; bark brown with grayish white blotches, covered with lighter brown lenticels; that on the young twigs shining reddish brown; wood white, moderately hard but easily cutting. Leaves exstipulate, smooth, deep green above, much lighter or glaucous green beneath, conduplicate on the upper surface, subcoriaceous, alternatingly crowded toward the ends of the branchlets, imparipinnate, the average ones about 3 dm. long; the 1 dm. long peduncle and rachis terete, shining smooth, more or less constricted and subarticulate at the insertion of the leaflets, 3 cm. protruding above the uppermost pair of leaflets and bearing a single leaflet; leaflets deciduous, entire, margins subinvolute, 3 to 5 pairs, 3 to 5 cm. apart, the basal ones somewhat smaller and suboblique, narrowly ovate lanceolate to oblong, 12 cm. long, 4 cm. wide below the middle, the upper portion gradually tapering to an acuminate point, the basal portion frequently inequilateral and subobliquely rounded or subobtuse, the terminal leaflet symmetric and elliptic to oblong; petiole glabrous, 1 cm. long, deciduous from the rachis and from the blade; veins conspicuous, brown beneath, 6 to 9 on each side, ascendingly curved, the reticulations obscure. Young infrutescence from the axils of the fallen leaves, barely equalling the foliage, the upper one third broadly paniculate, the articulate branches usually in pairs and divaricate; the ultimate branchlets comparatively short, subtended by glabrous bracteoles; pedicel 1.5 mm. long, rather thick, articulate at the base; calyx glabrous, united and persistent, rotately spreading, nearly 3 mm. across, bluntly 5-toothed; corolla and stamens not seen; disk of base of ovary glabrous, rim like, rather thick and rugose; ovary sessile, conical, 2 mm. long, 1.5 mm. thick across the base, glabrous; style none; stigma terminal, circular, 0.3 mm. in diameter; young fruits fusiform, 1 cm. long, 0.5 cm. thick through the middle, obscurely trigonal, 2 to 3-celled.

Type specimen 9179, *A. D. E. Elmer*, Lucban, Province of Tayabas, Luzon, May, 1907. A splendid tree in very humid woods between Lucban and Sampaloc. The absence of vascular bundles about the pith in the twigs, pinnate leaves and the 5-merous calyx throws our specimen into *Scutinanthe*. Its longer glabrous panicle at once distinguishes it from *S. brunnea Thw.* I take pleasure in naming this species in honor of *Dr. Adolf Engler.*

DICHAPETALACEAE.

Dichapetalum spicatum n. sp.—A sparingly but widely branched shrub, 3 to 5 m. high, with slender lax branchlets; wood whitish, closely grained and hard, its bark yellowish brown. Leaves submembranous, darker green above, yellowish green beneath when dry, alternatingly scattered along the glabrous terete twigs, ovately oblong, glabrous, the medium sized blades 12 cm. long and 6 cm. wide, apex acuminately curved, base broadly rounded or subtruncate, entire margins slightly involute; petiole 1 cm. long, subglabrous, deciduous; nerves nearly equally plain on both sides, the lateral 3 to 5 ascendingly curved and anastomosing at their tips; reticulations equally visible from both sides, comparatively faint, numerous, subparallel near the base and along the midvein.

Infrutescence terminal and subterminal, usually from the leaf axils, subpendulous, spicate, solitary or several from the same base, the longer ones 15 cm. long, the individual spikes very sparingly branched, the branchlets subtended by foliaceous bracts; flowers ascending, scattered along the short yellowish pubescent rachis, with short thick pedicels or none; pedicels subtended by a whorl of short membranous bracts which apparently remain after the flowers have fallen; calyx comparatively thin, glabrous, 4, nearly free, almost 3 mm. in length, 1.5 mm. wide across the base, ovate, deeply concave on the ventral side; corolla thick, rigid, soft villous, more or less united into a disk, much shorter than the calyx, with about 6 bluntly toothed segments; stamen of an equal number, inserted in the sinus; filaments glabrous, apparently unequal in length, the longer ones 1.5 mm. in length, the terminal portion incurved; anthers minute, elliptic, 0.5 mm. long, deciduous; ovary angular, densely vested with soft yellowish hairs; its apex trisulcate, each part with a short sublateral style bearing a large rugosely bilobed stigma; capsule triangularly ovoid, 1 mm. long, dehiscing from the apex along the quite prominent loculicidal suture, covered with a yellowish velvety pubescence when dry, purplish when fresh; seeds solitary in each of the 5 cells, surrounded by a light yellow coat, about 5 mm. long, base usually broad, apex with a minute point.

Type specimen 7497, *A. D. E. Elmer*, Lucban, Province of Tayabas, Luzon, May, 1906. In wooded ravines at 700 meters at the foot of Mount Banahao.

EUPHORBIACEAE.

Glochidion urophylloides n. sp.—Shrub, 3 to 5 m. high; slender branches smooth. Leaves scattered along the twigs, alternate, 2 to 5 cm. apart, submembranous, much varying in size at least, drying black, easily falling, ovate to oblong or the smaller ones elliptic, frequently inequilateral, apex obtuse or acute, base obtuse or rounded, glabrous, paler beneath, 3 to 5-nerved, upon glabrous 3 to 5 mm. long petioles subtended by short rather acute glabrous stipules. Flowers in axillary glomerules or in the axils of fallen leaves; the slender glabrous almost flexuose pedicels 5 mm.

long, arising from a very short densely bracteate tubercle; female flowers glabrous, yellowish green; perianth united at the base, persistent; the 6 segments elliptic, 1 mm. long, the larger ones nearly as wide; ovary glabrous, 4-celled; style short or obsolete, cleft into 4 rather thick arms, persistent; capsules 7 mm. in diameter, glabrous, about 4 mm. high, much compressed, the apex sunken, 4-celled; each cell with 2 seeds which are much flattened and about 2 mm. in diameter, smooth, brown.

Type specimen 8677, *A. D. E. Elmer*, Baguio, Province of Benguet, Luzon, March, 1907. The foliage is very suggestive of some species of *Urophyllum*.

Glochidion luzonense n. sp.—Erect shrub, 4 m. high; wood solid, reddish; bark brown, longitudinally but shallowly checked and scaling in thin plates; branches quite numerous, spreading, the slenderer ones drooping, densely rusty brown pubescent. Leaves alternate, scattered along the twigs, 1 to 1.5 cm. apart, ovate to elliptic, very unequal in size, 4 cm. long, 2 cm. wide, obtuse or rounded at the apex, base truncate or emarginate, margins subinvolute, dry and membranous, paler green beneath, soft pubescent especially beneath; the 7 to 9 pairs of nerves submarginally united, very evident beneath, reticulations nearly as conspicuous; petioles very short, densely pubescent; stipule setaceous, pubescent, equalling the petiole. Male flowers 1 to 3-clustered, upon ascending 5 to 10 mm. long very slender pubescent pedicels, yellowish; its 6 perianth segments united at the base, thick, oblong, ciliate pubescent on the dorsal median portion, 1.5 mm. long, unequal in length and width, apex acute; anthers 3, united to the connective which extends one third above them, forming a column or finally the tips spreading, the anther sacs only 0.5 mm. long; female flowers sessile, also 1 to 3-clustered, in the axils of the leaves or of fallen leaves; its perianth nearly 2 mm. long, only united at the base, the 6 ascendingly curved segments ciliate pubescent on the back, thickened, linear, acuminate; ovary densely ciliate, subtended by minute ciliated bracteoles; style terete, 2 mm. long, 0.75 mm. thick, erect, covered with a ciliate pubescence, the apex cleft into 3 very obscure lobes; capsule 3-celled, compressed at both ends, subpendulous upon slender pedicels, 1 cm. in diameter, pubescent, each cell 2-ovuled but comparatively few of the ovules grow to maturity.

Type specimen 8947, *A. D. E. Elmer*, Baguio, Province of Benguet, Luzon, March, 1907. In ravines mixed with shrubs and small trees between the barrios of Kamucao and Bayabas near Sablan. Called Butpat by the Igorrotes whose women smoke the foliage as a poor substitute for the tobacco leaf. It differs from *G. molle Blm.*, its nearest ally, in not having oblique leaves, only three instead of five anthers and in not being a tree nor even tree like. A more distant relative is *G. villosum Miq.*

Glochidion reticulatum n. sp.—Apparently a laxly branched and spreading shrub; branchlets very slender, thin, terete, with gray bark, glabrous or only the young twigs with a sparse pubescence. Leaves flat or with recurved tips, membranous alternatingly arranged along the branchlets, about 1.5 cm. apart, diverse in size, the average ones 7 cm. long by 3 cm. wide across the middle, shining smooth on the upper surface beneath glabrous or with a few scattering hairs along the nerves, ovate to oblong, abruptly acute in the smaller elliptic ones, normally acuminate, base rounded or bluntly obtuse, symmetrical; nerves prominent beneath and quite evident from the upper side, 3 to 5 on each side, coarsely anastomosing above the middle, the reticulations nearly as prominent as the primary nerves; petiole subglabrous, 2 mm. long, stout; stipules only one half as long, finely pubescent, setaceously pointed. Male flowers usually single in the leaf axils or occasionally 2 and even 3, upon very slender subglabrous or sparsely pubescent 1 cm. long pedicels; perianth coriaceous, subglabrous, or the outer ones ciliate pubescent, 2 to 3 mm. long; the 5 unequal segments oblong to oblanceolate, with acute tips, bases united; anthers 3, closely united to the fleshy connective which terminates into 3 brown points 0.3 mm. long, the anthers 1 mm. long, the ovoid column 0.75 mm. in diameter; pistillate flowers and fruits not seen.

Type specimen 8188, *A. D. E. Elmer*, Los Baños, Province of Laguna, Luzon, April, 1906. This species has been collected only twice in the same locality.

Glochidion leytense n. sp.—Erect shrub, 2 to 3 m. high; branches quite slender, sparingly rebranched, smooth, dark brown at least when dry. Leaves alternate, subcoriaceous, arranged along the twigs in distichous rows, about 4 cm. apart, mostly horizontally spreading, flat, glabrous, slightly inequilateral, ovately oblong, the medium ones 15 cm. long by 7 cm. wide below the middle, apex mostly acute and tipped with a fine mucronate point, base rounded, edges entire; nerves 5 on each side, brown, more conspicuous beneath; petiole 5 mm. long, stout, glabrous, thickened toward the base. Inflorescence axillary, rather numerously flowered; pedicels very slender, glabrous, subflexuosely spreading, 15 mm. long, subtended at the base by many minute bracts; perianth glabrous and subglaucous on the outer side, united only at the base, persistent, the 6 segments 2.5 mm. long, obovate to oblong, with obtusely rounded apices, rather thick; anthers sessile, chiefly united into an erect column, finally their tipped connectives separating, 3, about 1 mm. long, 0.5 mm. wide, more or less linear, attached to the thick brown colored connectives; pistillate flowers similarly clustered, but fewer and upon shorter pedicels; the perianth glabrous, 2.5 mm. long, coriaceous, the 6 segments united at the base into a short cup; ovary glabrous or subglaucous, compressed; style 1.25 mm. long, 1 mm. in diameter at the base, conically tapering to the 7 to 9 sulcate apex, glabrous; fruit not seen.

Type specimen 7377 (a) *A. D. E. Elmer*, Palo, Province of Leyte, Leyte, January, 1906. In shrubby light woods of the hills. It has affinities with *G. cumingii Muell. Arg.* and *C. album (Blco.) Boerl.*, but differs from both in being wholly glabrous. This same character also distinguishes it from *G. trichogyum Muell. Arg.*

Glochidion quinquestylum n. sp.—A flat topped spreading tree, 5 m. high; wood not extremely hard, covered with scaling bark; branches numerous, ascending, the older grayish white bark of the branches minutely lenticelled. Leaves dull green, subglabrous beneath, flat, ascending, submembranous, alternately arranged in subdistichous rows along the short pubescent twigs, about 1 cm. apart, diverse in size, the larger ones 7 cm. long and 2.5 cm. wide across the middle, oblong, apex acute or simply obtuse, the lower one half very unequally sided, at the base with a rounded lobe on the lower side, the opposite side nearly straight, margins entire, with 5 to 8 faint nerves on each side, glabrous; petiole 5 mm. long, subglabrous; stipule thick, persistent, 2 mm. long, sharply acuminate, with a very short ashy gray pubescence. Inflorescence axillary, flowers mostly solitary but occasionally 2 to 3-clustered, the pistillate sessile, the staminate upon 5 mm. long pedicels which are subtended by minute bracts; staminate perianth 1.5 mm. long, subglabrous, imbricate, the 6 unequal segments mainly free, rounded at the apex, oblong, thickened; anthers 5, attached to the fleshy brown connective which exceeds them, 0.75 mm. long, forming a column; pistillate perianth more or less united into a cup, cinereous pubescent, its segments acute, persistent, ovary glabrous; styles 2 mm. long, subglabrous, thick, triangular, tapering from the base clear to the apex, well separated, frequently only 3 but normally 5; capsules solid, 8 mm. across, equally compressed at both ends, smooth, turning reddish when exposed to the light, 5-celled; ovules 2 in each cell; seeds 3 mm. long, brown when dry, yellowish when fresh, flat on one side, smooth.

Type specimen 8916, *A. D. E. Elmer*, Baguio, Province of Benguet, Luzon, March, 1907. On open dry hot ridges west of the Sablan Falls. The Igorrotes call it Shimey.

Glochidion benguetense n. sp.—A lax numerously branched bush, 2 m. high; slender twigs more or less short pubescent, half drooping. Leaves very many, 5 to 10 mm. apart, alternating, those toward the tips of the twigs very small, the older ones 3 cm. long by 12 mm. wide just below the middle, dry, glabrous and shining green above, sparsely pubescent on the nerves beneath, ovate to lanceolate to oblong, acute at the apex, base rounded or obtuse, most of them a trifle inequilateral, the 3 to 5 pairs of nerves and reticulations beneath faint, scarious and deflexed, upon 1 to 2 mm. long subglabrous petioles; stipules triangularly acuminate, subglabrous, a trifle longer than the petioles, thick. Flowers pendulous, mainly in the upper leaf axils, yellowish green, male flowers upon slender glabrous 3 to 5 mm. long pedicels subtended at the base by minute bracteoles, from 1 to 3-clustered; the 5 or 6 segments also glabrous, 1 mm. long, oblong to elliptic; anthers 3, united along the connective, included; female flower subsessile, its 5 or 6 segments oblong, persistent, nearly 2 mm. long, radially spreading from the united base; ovary densely pubescent, short pedicelled; style 1.5 mm. long including the 4-parted stigmatic apex, 0.75 mm. thick, glabrous or only sparsely pubescent near the ovary; capsule glabrous, 7 mm. in diameter, flattened, 4-celled, each cell with 2 flattened seeds.

Type specimen 8665, *A. D. E. Elmer*, Baguio, Province of Benguet, Luzon, March, 1907. On hot dry hillsides at the barrio of Bacong. The Igorrotes call it Sangke.

Glochidion subfalcatum n. sp.—Spreading tree, 6 m. high, with hard reddish heart wood; bark thick, scaling in coarse plates; branches few, erect or ascending, thick; the branchlets spreading, subterete, smooth, gray. Leaves coriaceous, alternatingly arranged along the twigs in distichous rows, 1.5 to 2 cm. apart, deciduous, leaving large elevated scars between the 2 persistent stipules, lucid green above, much paler or subglabrous beneath, ascending, with recurved tips and more or less conduplicate on the upper side toward the apex, very inequilateral, usually subfalcate, oblong, 14 cm. long, 4 cm. wide across the middle, glabrous, apex acute or acuminate, usually curved, base obtuse, rounded or subtruncate and with very unequal sides; veins 5 to 7 or even 9 on each side, dark brown, conspicuous beneath; thick woody petiole 3 to 5 mm. long; stipules rigid, shining, triangularly acute or even spinescent. Flowers not seen. Capsules upon slender glabrous 3 to 5 mm. long persistent pedicels, 1 to 5-clustered in the leaf axils, subglobose, 2 to 3 cm. in diameter, yellowish green, those exposed to the sunlight turning red, bladdery, 5-celled, dehiscing from the apex into 10 parts, the yellowish red seeds 2 in each cell, arranged upon the central axis, brown and shining smooth when dry, about 5 mm. long, irregularly obovoid, the base pointed.

Type specimen 8915, *A. D. E. Elmer*, Baguio, Province of Benguet, Luzon, March, 1907. This very peculiar species has been collected only twice in the Philippines and both times on an open dry hot ridge west of the Sablan Falls.

Glochidion sablanense n. sp.—Shrub, several m. high; bark finely checked scaling in thin plates; branchlets soft yellowish pubescent. Leaves alternately arranged in distichous rows along the twigs, 1 to 1.5 cm. apart, inequilateral, ascending, smooth and lucid green above except the larger veins, submembranous, beneath pubescent only on the veins and reticulations but becoming glabrous in age, apex acuminate or acute, its rounded tip usually terminated by a very fine point, base rounded, oblong, 7 cm. long, 2.5 cm. wide below the middle where most of the leaves are a trifle wider; nerves fine but evident beneath, 3 to 5 or in the larger ones 7 on each side, ascending, their apices anastomosing, reticulations faint; petiole 2 mm. long, densely pubescent; stipule linear, at least as long as the petiole, subglabrous. Male flowers suberect, upon very slender 8 mm. long pubescent pedicels, 1 to 3-clustered in the leaf axils or in the axils of their scars, subtended by minute bracteoles; the perianth glabrous, 2 mm. long, the 6 unequal and thick segments united at the base and oblong; anthers 3, columnar, 1 mm. long, attached to the fleshy connective which exceeds them; female flower short stipitate, similarly placed as the male flowers; its 6 segments united at the base, glabrous or ciliate along the median dorsal line, 2 mm. long, oblong, rounded at the apex, rotately spreading, thickened; ovary densely ciliate pubescent; style slightly longer than 1.25 mm. pubescent toward the ovary, otherwise glabrous, nearly 1 mm. thick, the apex 4-cleft; capsules not seen, but judging from the stigma it is 4-celled.

Type specimen 8770, *A. D. E. Elmer*, Baguio, Province of Benguet, Luzon, March, 1907. On an exposed hill above Sablan. The leaves of this species is also used by the Igorrote women as a substitute for tobacco. The characters of the pistillate inflorescence should keep it from being confused with the common pubescent form of *G. philippinense* (*Cav.*) *Benth.*

Homalanthus alpinus n. sp.—Small erect tree, 8 m. high; ultimate branches rather numerous, rigid, forming a round topped crown; younger bark smooth, brown. Leaves densely clustered toward the ends of the nearly parallel twigs, the lower ones early falling leaving large yellowish scars, ascending, coriaceous, lucid green above, glaucous beneath, short acute to obtuse at apex, base cuneate or obtuse, rhomboid to broadly elliptic, the average blade 6 cm. long and 6 cm. wide across the middle, glabrous, the base subtended by a conspicuous pair of glands equally prominent on both sides; nerves 5 to 7 pairs, comparatively straight and ascending, reticulately anastomosing toward the apex; petiole glabrous, usually tinged with red, slender, 3 to 5 cm. long, subtended at the base by a pair of smooth yellowish stipular glands or excrescences; bud scale 2 cm. long, acuminate brown, glabrous on both sides. Fruits solitary or in small clusters from the upper leaf axils; pedicels 5 mm. long, glaucous green, strongly recurved; calyx also persistent, dry, 3-toothed; style 3 mm. long, glabrous, divaricately branched from near the base, persistent; capsule olive green, short stipitate, somewhat fleshy obovoid or broadly ellipsoid, subcompressed, loculicidally dehiscent when old, 2-celled, 1 cm. long, almost as wide; seeds 1 in each cell, ellipsoid or obscurely 3-angled, nearly black, smooth, 5 mm. long, 3 mm. thick, pendulous from the much flattened placentae; staminate flowers not seen.

Type specimen 7523, *A. D. E. Elmer*, Lucban, Province of Tayabas, Luzon, May, 1906. At 2000 meters on Mount Banahao it forms dense groves and is only found in high altitudes. It is a segregate from the lowland species *H. populneus (Geisel.) Pax* which is represented by my number 9226 and is found in thicket borders of meadows around Lucban. The leaves of our specimen are not acuminate nor membranous, with shorter petioles and more compactly crowded toward the ends of the branchlets.

Phyllanthus leytensis n. sp.—Strict, shrub, sparsely branched at the top, 3 to 8 dm. high or a few stems from the same root; stems terete, about 5 mm. thick; bark light gray, smooth, obscurely checked, the younger bark brown pubescent or only pulverulent. Leaves chiefly at the top, horizontally spreading or ascending, frequently scattered along the upper portion of the stem: rachis brown, with similarly colored puberulent hairs, slender, usually curved, 1 to 2.5 dm. long, leaflet bearing the entire length; leaflets distichous, flat, divaricate and horizontally disposed, membranous, alternating, about 4 mm. apart, shining green above, much paler or subglaucous beneath, glabrous, inequilateral, the average ones 2 cm. long and 1 cm. wide, rhomboidly rectangular but usually a trifle wider above the middle, apex truncately rounded and finely apiculate, base obtuse or subcuneate, sessile, subtended by 1 to 3 subequal brown persistent sharply acuminate bracts, midvein prominent beneath and curvingly oblique. Flowers chiefly in the upper leaf axils, 1 to 5-clustered, mostly ascending but recurved in fruits; the peduncle about 2 cm. long, very slender, glabrous, thickened at the apex; calyx 4, subpersistent, triangularly ovate, 2 mm. long, pectinate, 1-nerved and with fine lateral ones, spreading but the tips usually incurved; corolla of 4 petals, entire, glabrous, broadly flattened, 0.5 mm. long, 0.75 mm. wide, truncate at the apex, inserted upon the base of the calyx; disk prominent, 0.75 mm. across, shallowly 4-lobed; style 6, very short; stigma minute; ovary glabrous; capsule smooth, yellowish brown, 3-ridged or angled, 3-celled, 4 mm. long, at least that in diameter, the apex truncate, loculicidally dehiscent; seeds mostly 1 in each cell, ovately oblong, 3 mm. long, 2 mm. wide at the base, smooth, triangularly flattened, at the middle ventral side attached to the central placenta, apex pointed, base broadly rounded.

Type specimen 7267, *A. D. E. Elmer*, Palo, Province of Leyte, Leyte, January, 1906. In fertile soil of creek bottoms covered with woods and undershrubs. Near to *P. blancoanus Muell. Arg.* but smaller, not verticillately branched, styles distinctly more numerous and foliage not at all linear.

Pimeleodendron dispersa n. sp.—Lax shrub, 3 m. high; branches smooth, gray. Leaves flat, submembranous, alternate, very variable in size, oblong or obovate, apex acute or obtuse, base rounded or abruptly obtuse, the larger ones 3 dm. long by 1 dm. wide, glabrous; nerves 9 to 13 pairs, rather faint, the midrib equally prominent on both sides, reticulations coarse; petiole persistent, glabrous, 2 to 4 cm. long, thickened at both ends. Infrutescence lateral, usually from the axils of leaves or from the axils of fallen leaves, pendulous, 1 to 3 in a cluster; pedicels 3 to 5 cm. long, slender, glabrous, persistent, at the base subtended by minute scale like bracts, conspicuously thickened toward the apex; calyx on capsules persistent, reflexed, 4 mm. long, united at the base, the 5 larger segments acute, the much smaller ones alternating; central axis of capsule persistent, triangularly winged especially toward the top; capsule flattened, 12 mm. high, triangularly rounded, 2 cm. in diameter, 3-celled, septicidally dehiscent, pericarp smooth, green and leathery, endocarp horny and very smooth on the interior; stigma on most capsules 6-segmented; seeds 2 in each cell, the side next to the septum flat, the dorsal side convex, attached ventrally by a very thin membrane, base triangularly indented, 1 cm. long, less than that across.

Type specimen 7245, *A. D. E. Elmer*, Palo, Province of Leyte, Leyte, January, 1906. Only one shrub was found in the thin woods of the foothills. The fruits were collected in an almost mature state. After lying on my table for one or two days they began to burst with a force that scattered the seeds two to three dm. about. The capsules began to burst from the base along the septae but the spontaneous action was strong enough to continue the splitting along the dorsal suture from the apex clear to the base. This last operation was necessary in order to allow the seeds to be thrown out from between the septae, and often the dispersing force was violent enough to separate the exocarp from the endocarp. A small genus of two to three Malayan species and which is here for the first time reported from the Philippines.

Daphniphyllum luzonense n. sp.—Shrub or small tree; twigs smooth, with light brown lenticels. Leaves alternate, drying brown, usually clustered toward the ends of the young shoots, ascending, nearly flat, submembranous, glabrous, broadly lanceolate to narrowly oblong, the blade of the larger ones 15 cm. long and 5 cm. wide, darker green above, apex acute to acuminate, base obtuse, entire margins slightly involute; nerves 5 to 7 on each side, ascending, faint, except the midrib; petiole persistent, 3 to 5 cm. long, glabrous; stipules caducous, 5 mm. long, glabrous, sharply acuminate. Inflorescence in the lower leaf axils or more frequently on the second year old branchlets, ascending, spicately racemose, exceeding the petioles, 1 dm. long or frequently less; peduncle slender, glabrous; pedicels umbellately clustered at the apex though more or less scattered along the stalk, 1 to 1.5 cm. long, slender, glabrous, subtended by minute caducous bracts; pistillate flowers sessile, subtended by 4 bracts; ovary ovoid or subellipsoid, glaucously glabrous; style short, glaucous; stigma circinately 2-lobed, the rough brown stigmatic portion on the ventral side; immature fruit fleshy, obovoid, 15 mm. long, one half that across above the middle, olive green; seeds imbedded at the base.

Type specimen 8615, *A. D. E. Elmer*, Baguio, Province of Benguet, Luzon, March, 1907. This alpine species is not *D. glaucescens Blm.* from which it is at once separated by its much larger membranous and acuminate leaves which are not glaucous underneath, slenderer petioles and with longer inflorescence. My number 8538 which is distributed as *D. glaucescens Blm.* was collected in the same region and may also prove to be different from *Blume's* species.

Croton curtiflorus n. sp.—Tree like shrub or an erect tree 10 m. high, with rather short numerously branched ascending branchlets; wood finely grained; bark smooth or roughened, brown but often grayish white mottled. Leaves shining, chartaceous, darker green above, alternatingly scattered along the twigs, only the young leaves and terminal portion of the twigs sprinkled with yellow fringed scales, glabrous in age, margins entire and more or less recurved, oblong, the larger ones 10 cm. long and 4 cm. wide, apex obtuse to acute, base rounded or broadly obtuse; nerves 3 to 7 on each side, conspicuous beneath, strict, united and extending only two thirds the distance from the base to the apex; petiole thick, densely covered with scales but ultimately becoming subglabrous, persistent, 5 to 8 mm. long. Inflorescence axillary, strict, 1 to 3 cm. in length, the racemes short and very sparingly branched; flowers dioecious upon the same stalk; the pistillate flowers subtended by ovate, less scaly covered bracts about 4 mm. long; the calyx subfusiform, with golden yellow scales, bracteolate, terminated by deciduous ligulate 2 mm. long segments; petals none; ovary soft adpressed pubescent; style cleft clear to the base, glabrous, striate, more or less twisted, dark brown and granular along the stigmatic side, about 1 cm. long; subtending scales of the male flowers smaller, the short calyx with shorter segments; stamens about 10 or fewer; filaments at first falsely united, soon becoming free, unequal in length, the longer ones 4 mm., glabrous; anther persistent, basifixed, bluntly apiculate, flattened, ovate from the side, dehiscing along the lateral sides, reddish brown.

Type specimen 8651, *A. D. E. Elmer*, Baguio, Province of Benguet, Luzon, March, 1907. Among thickets along streams of the pine region about Baguio. The foliage is covered more or less with bladders.

Croton longipedunculatus n. sp.—Shrubs, 3 to 5 m. high; branches yellowish, the younger parts scurfy pubescent and more or less ridged. Leaves mostly toward the ends of the twigs, flat, subcoriaceous, oblanceolate, the smaller ones a few cm. long, the larger ones 3 dm. in length, the margins subentire or crenately undulate, about 9 cm. wide above the middle, apex acute, the base cuneate, glabrous above when old or with a few strigose hairs, beneath sparsely pubescent with yellowish hairs; lateral nerves 15 to 17 pairs, more prominent beneath, ascending and reticulately united at their ends with melleus colored adpressed hairs, midrib very stout; petiole at most 2 cm. long, stout, ridged, usually upwardly curved, scurfy pubescent; peduncles solitary from the lower leaf axils, subpendulous, somewhat compressed, pubescent, 1 to 3 dm. long, bract and flower bearing above the middle; secondary peduncles usually less than 1 cm. in length, ascending, ciliate pubescent, bearing several flowers, the lower ones subtended by foliaceous bracts, the upper ones triangularly acuminate to setaceous; pedicels of fruits 15 mm. long, gradually thickened from the base, subtended by a whorl of 3 short acute ciliate bracts, similarly pubescent; petals imbricate, 1.5 mm. long, nearly as broad, very convex on the back, the outer ones hairy and subpersistent; styles very short, glabrous, 4-cleft, dark brown when dry; ovary short but densely tomentose; capsule obovoid, about 1 cm. long, 3-celled, short pubescent but finally nearly glabrous; seeds one in each cell, subterete in outline, 6 mm. in diameter, subtruncate and with a median ridge at the base, inner sides nearly flat, smooth, streaked with gray and black.

Type specimen 7264, *A. D. E. Elmer*, Palo, Province of Leyte, Leyte, January, 1906. An undershrub of the woods at 330 meters about six miles beyond Palo.

Croton appendiculatus n. sp.—Shrub, 5 m. high, numerously and ultimately slenderly branched; wood soft and white, with grayish white bark. Leaves alternate, very unequal in size, ovate to ovately lanceolate, submembranous, the average blade 12 cm. long, 6 cm. wide below the middle, the apical portion gradually tapering to a slender acuminate point, the base cuneately rounded or subtruncate, margins entire, green and glabrous on the upper surface, but dull green when dry, light ashy gray and short tomentose beneath, a pair of black glands on the upper surface at the base; petiole and younger portion of twigs light gray, similarly pubescent, the former 2 to 15 cm. long, terete; veins 5 to 7 on each side of the stout midvein, much ascending, obscurely united, the cross bars and reticulations faint, the basal pair usually with lateral veinlets from the lower side. Infrutescence slender, equalling or exceeding the foliage, mostly from the leaf axils, paniculate, the branchlets slender and subpendulous, short yellowish gray tomentose, the branchlets very sparingly rebranched; pedicels scurfy pubescent, 3 to 5 mm. long; calyx persistent, spreading when in fruit, similarly pubescent, united at the base, 3-segmented, the lobes triangularly acute and 1 to 2 mm. in length; style 2 to 3 mm. long, nearly 3-cleft to the base, rather thick and rigid, the outer side brown scurfy pubescent, dark brown ciliate on the inner surfaces; capsule trigonous, ashy gray, covered with a very short scurfy or stellate pubescence, compressed, about 8 mm. thick without the appendages, primarily septicidally dehiscing but ultimately also loculicidally, leaving the central placenta stand-ing; the appendages of the capsule are 5 mm. long, similarly pubescent, subligulate, flexible, rather numerous and persistent; seeds solitary in each cell, pendulous from the apex, subglobose, shining coal black, persistent long after the carpels have been shed, 3 mm. in diameter; staminate flowers not seen.

Type specimen 9215, *A. D. E. Elmer*, Lucban, Province of Tayabas, Luzon, May, 1907. It was growing in light woods of well drained soil on the higher inclines at 700 meters.

Mallotus eglandulosum n. sp.—Shrubs or small trees with numerous tough branches; branchlets grayish brown, covered with lighter colored lenticels. Leaves submembranous, flat, very unequal, the average blades 13 mm. long, 6 mm. wide across the middle, elliptic to oblong, nearly equally rounded toward both ends, abruptly terminated into acute or acuminate point, base obtuse, glabrous, much lighter green beneath, margins entire, alternatingly scattered along the branchlets, without basal glands; nerves 5 to 7 on each side, very pronounced beneath, ascendingly curved, cross bars fine but quite evident; petiole 3 cm. long, straight, thickened at the ends, subglabrous. Inflorescence axillary, 3 to 5 cm. long or longer, sparsely and very shortly branched, upon stout ascending woody stalks; female pedicels 7 mm. long, pubescent, subtended by short sharply triangular bracts finely ciliate along the margins and on the midnerve; ovary 2 mm. thick, subglobose, similarly pubescent, subtended by 5 to 7 acute to acuminate 1.5 mm. long bracts; styles divided clear to the base, glabrous, granular, 5 mm. long, spreading; mature capsule much flattened, 1 cm. wide, 7 mm. thick, strongly 3-lobed, muricate, septicidally dehiscent, 3-celled; seeds 1 in each cell, subglobose, shining, about 4 mm. thick, streaked with gray and dark brown.

Type specimen 7152, *A. D. E. Elmer*, Palo, Province of Leyte, Leyte, January, 1906.

Antidesma membranaefolium n. sp.—A shrub, 3 m. high, the branches rigid and crooked; wood whitish or the inner becoming red, easily breaking, covered with smooth yellowish gray bark. Leaves membranous, scarious ,horizontally spreading, dull green on both sides, alternate. usually only a few at the ends of the twigs which are puberulent, oblong, unequal in size, 2 dm. long, 9 cm. wide across the middle, glabrous, shining brown on both sides when dry, apex acuminate, base rounded, margins entire; petiole very thick, 5 mm. in length, puberulent; stipule subpersistent, linear and bract like or frequently equal in length and similar in pubescence; nerves of the leaves oblique, parallel, conspicuously arched and united at their ends, brown, glabrous, prominent beneath, 12 to 16 on each side, reticulations plainly evident. Inflorescence pendulous, 1 to 3-clustered, from the axils of the fallen leaves but occasionally from the leaf axils, spicate, 1 to 3 dm. long, the axis subglabrous in age, occasionally bracteate toward the base, densely flowered above the middle and especially toward the apex, dull brick red; flowers divaricate, subtended by minute persistent bracts; pedicels 1.5 mm. long, thick, short ferruginous pubescent; calyx similarly pubescent, 1 mm. high, united, 5 to 7-toothed; corolla absent; ovary brown instead of reddish, oblong in outline or ellipsoid, 2 mm. long, dirty yellowish pubescent; stigma fleshy, conspicuous, cleft and radially recurved, the 5 to 7 segments acute and glabrous; fruits reddish when exposed to the light, bladdery, glabrous or pulverulent, ovately suboblique, compressed, base broadly rounded, apex pointed, 8 mm. long, 5 mm. wide across the base, 1-celled, with 2 pendulous ovules from near the apex.

Type specimen for fruit 9088, for flower 7913, *A. D. E. Elmer*, Lucban, Province of Tayabas, Luzon, May, 1907. In deeply shaded woody slopes of ravines at 750 meters. Pistillate and fruiting specimens were several times observed but no staminate flowers.

AQUIFOLIACEAE.

Ilex rolfei n. sp.—A small slender tree, 6 m. high; wood hard; bark mottled; ultimate twigs numerous, quite slender. Leaves subcoriaceous, also numerous, alternatingly scattered along the glabrous, angled twigs, the blades 6 cm. long, and 2 cm .wide, oblong to lanceolate, apex more or less abruptly acuminate, edges entire or obscurely repandly serrate, paler green beneath, glabrous even in the the young state, base mostly obtuse; petiole 5 to 8 mm. long, glabrous, caniculate along the upper side, midvein prominent beneath, the 5 to 7 lateral pairs nearly as faint as the reticulations. Flowers clustered in the leaf axils, creamy yellow, normally 12-clustered, upon a short common stalk; pedicels 4 mm. long, pulverulent, subtended near the base by 2 opposite or subopposite apiculate bracts; calyx subglabrous, the 4 segments united at the base, broadly triangular, about 1 mm. long; corolla 4-segmented, the basal one third united; the segments 4 mm. long, nearly 2 mm. wide, obtusely rounded, rotately reflexed in full anthesis; stamens 4, erect but not longer than the corolla, alternating with the segments and adnate to the short corolla tube; free filaments glabrous, fleshy, at the base somewhat thicker and subcompressed; anthers broadly ovate or cordate, basifixed, 1 mm. in length; ovary subglabrous, 1 mm. long, conically 4-sided, its apex 4-sulcate.

Type specimen 8764, *A. D. E. Elmer*, Baguio, Province of Benguet, Luzon, March, 1907. Along the creeks of shallow ravines in the pine region at 1700 meters. I take pleasure in naming this unique species after *Mr. R. A. Rolfe.*

ICACINACEAE.

Gonocaryum cognatum n. sp.—Shrub, 3 to 5 m. high; branchlets green, smooth, rather crooked. Leaves thick and rigid, glabrous, lucid green above, much paler beneath, its entire margins subinvolute, oblong to elliptic, variable in size, the average ones 20 cm. long and one half as wide, apex rounded with a short obtuse point, base rounded or short obtuse, deciduous, leaving large scars; nerves 3 to 5 on each side, those arising from below the middle much ascending, the midrib and the larger lateral ones delicately fluted, reticulations faint; petiole thick, rigid, caniculate. Fruits mostly solitary, terminal, axillary or along the branchlets, upon 8 mm. long stout glabrous green peduncles; nut obovoid, 3 cm. long, 2.5 cm. in diameter above the middle, hard, shining smooth, green, with 5 prominent ridges from base to subtruncate apex; calyx persistent in the sunken apex, 5-segmented, the lobes 1.5 mm. long and elliptic; seeds in tough reddish brown integuments.

Type specimen 7352, *A. D. E. Elmer*, Palo, Province of Leyte, Leyte, January, 1906. Rare in dry dense woods at 330 meters.

VITACEAE.

Leea banahaensis n. sp.—A low undershrub. 1 to 1.5 m. high; stems erect or suberect, very sparingly branched, the thin bark gray, somewhat angled, rooting at the lower nodes. Leaves 2 to 3 pairs, toward the top, subcoriaceous, obovate, the apex rounded and with an apiculate tooth, the lower portion abruptly cuneate and about 2 cm. wide at the base, the entire margin equally apiculate or toothed with rounded callous tips, the base truncate or emarginate and subtended by a pair of 1.5 cm. long ovate foliaceous bracts, glabrous, 3 to 5 dm. long, about 2 dm. wide above the middle; nerves 13 to 17 pairs, glabrous, more prominent beneath, reticulations also conspicuous, the straight midrib strong with its keel corrugated; petiole 1 to 3 cm. long, stout and similarly keeled. Inflorescence terminal, subtended by diverse foliaceous bracts, about 5 cm. long and fully as wide, but more or less much varying in size, usually with 3 stout peduncles; flowers dirty white, cymosely clustered on the ends of the thickened peduncles or upon their short branches, the pedicels about 3 mm. long; glabrous calyx 2 mm. long, fully as wide, 4-toothed; petals recurved, 4, nearly 4 mm. long, oblong, the edges ventrally turned, the obtuse apices thickened and with an inflexed tip, quite rigid; staminal tube 3 mm. long, connate, roundly 4-toothed; the 4 anthers included, falsely united; filaments 2 mm. long, glabrous and brown; the anthers strongly inflexed, 0.5 mm. shorter than the filament; apex acute, dehiscing longitudinally along the inner side, style slender; stigma minute; berry flattened at both ends, otherwise subglobose, yellow, 1 cm. thick.

Type specimen 7509, *A. D. E. Elmer*, Lucban, Province of Tayabas, Luzon, May, 1906. Found in rich soil of dense woods at 800 meters on Mount Banahao. It is separated from *L. magnifolia Merr.* by its smaller differently shaped opposite leaf blades which are subtended by a pair of foliaceous bracts, and most conspicuously by its strongly corrugated midvein.

Leea parva n. sp.—A low sparingly branched erect or suberect shrub, 1 to 2 m. high; stems terete, 1 cm. thick, brown, obscurely zigzag towards the top. Leaves several, scattering, but only toward the apex, membranous, glabrous, shining green above, much lighter beneath, when dry the upper surface dull brown, beneath lighter shining brown, imparipinnate, subentire towards the base, coarsely serrate towards the apex, abruptly terminating into an acuminate point, base obtusely rounded or subcuneate; petiole less than 1 cm. long, those of the smaller leaflets only 5 mm. long, obscurely angular, much enlarged at the base, after falling leaving large scars; the basal pair of branches always with 3 leaflets only the terminal branch usually with 5 leaflets; the lower pair of leaflets subelliptic to rotund, about 7 cm. long and 4 cm. wide across the middle; the terminal leaflet 18 cm. long and 7 cm. wide above the middle, oblong to obovate; nerves very prominent beneath, 5 to 9 pairs, brown, covered with a similarly colored short pubescence, oblique, the tips forming a zigzag line 2 mm. below the margin, cross bars similar in color but subglabrous; the spatulate bract of the leaf axils persistent. Inflorescence corymbosely paniculate, 5 cm. long, at least that in width at the top, from the terminal leaf axil or occasionally from the second or third upper leaf axil also; peduncle reddish, 1 or 3 from the base, 2 cm. long, strict, brown pulverulent, angular, striate; secondary peduncle and pedicel much shortened, subtended by very minute bracts, otherwise similar to the main peduncles; flowers usually 3-clustered, sessile or short pedicelled; involucre thick, fleshy, glabrous, 3 mm. long, much contracted at the base, subturbinate, the 5 obtuse segments about 1 mm. long; calyx greenish yellow, smooth, very thick towards the apex, acute, united near the base, valvate, about 3 mm. in length; corolla comparatively thin, shorter than the calyx, 2 mm. long, with milky white spots on the outer side of the free portion, terminated by 3 very short round lobes; stamens also 5, opposite the calyx segments; the filaments 1 mm. long, subterete, rather thick, dark brown, its bases connected with the callous rim which coalesces to the inner side of the corolla segments; anthers fully as long, oblong, sharply inflexed; style glabrous, brown, 1 mm. long, bearing a lighter colored terminal stigma.

Type specimen 9175, *A. D. E. Elmer*, Lucban, Province of Tayabas, Luzon, May, 1907. An undershrub of woods in damp deeply shaded soil along water courses at 650 meters near the base of Mount Banahao. Only a few plants were observed. It may prove only a variety of *L. divaricata T. et B.*

Leea congesta n. sp.—Erect or suberect unbranched shrub, nearly 2 m. high; stems yellowish brown, obscurely lenticelled, 2.5 cm. thick, crooked at least towards the top. Leaves 3 to 5 in number, 3 to 7 cm. apart, ascending, radially spreading, glabrous, becoming dark brown when dry, imparipinnate; leaflets 7 to 9, dark velvety green above, much lighter beneath, divaricate and slightly ascending, tough, coriaceous, narrowly oblong to lanceolate, obtuse to subtruncate at the base, apex abruptly terminated into a slender point, margins subentire especially towards the base or crenately toothed, 2 dm. long, 5 cm. wide, the terminal leaflets somewhat larger, the basal ones frequently much smaller; petiole 0.5 to 1 cm. long, glabrous; nerves very prominent beneath, oblique, strict, parallel, 7 to 9 or even as many as 13 pairs, ending in the callous pointed teeth, usually also submarginally united, cross bars and reticulations rather numerous and conspicuous, peduncle 1 dm. long, rachis about 2 dm. long. Inflorescence densely congested, terminal or in the axil of the uppermost leaf, about 3 cm. thick, subsessile, ovoid, or in ovoid clusters upon short stout peduncles; pedicels slender, 3 mm. long, glabrous; involucre 4 mm. long, glabrous, chartaceous, the basal two thirds united, divided into 4 obtuse segments, dull pink; calyx creamy white, 6 mm. long, the basal two thirds turbinate and united, its 4 ovately obtuse segments subreflexed in anthesis; corolla comparatively thin, united, terminated by 4 obtusely rounded 1 mm. long segments which on the outer side are spotted with milky dots; stamens 4, opposite the segments and inserted upon the throat; filaments 1.5 mm. long, glabrous, flattened, at the base connected with the callous rim which coalesces with the inner side of the corolla; anthers at least as long, strongly inflexed, lanceolate, purplish at the pointed end; ovary glabrous, flattened, obscurely 4-lobed; style strict, 2 mm. long, bearing a very short pubescent terminal stigma; berries equally flattened at both ends, 16 mm. across, normally 4-lobed, 1 cm. long.

Type specimen 8116, *A. D. E. Elmer*, Lucban, Province of Tayabas, Luzon, May, 1907. On banks of streamlets in dense woods at 850 meters on Mount Banahao. As early as 1901 *Sr. R. Garcia*, collected it at Surigao, Mindanao. The writer also collected it at Sablan, Province of Benguet, Luzon, in 1904. More recently *Sr. Maximo Ramos* collected fine fruiting specimens at Antipolo, Province of Rizal, Luzon.

TILIACEAE.

Grewia banahaensis n. sp.—Small trees, with ultimate branches lax and slender; wood hard, covered with brown bark. Leaves glabrous or only subglabrous beneath, not numerous, but scattered along the divaricate subglabrous very thin twigs, lanceolate to narrowly oblong, alternate apex slenderly acuminate, base obtuse, 13 cm. long by 3 cm. wide, membranous, flat or only the tips recurved, the lower one half entire, the upper margins obscurely undulate, slightly paler beneath; nerves 3 to 5 pairs, much ascending and submarginally united, the lowest pair arising from the base, with minute axillary glands, petioles 1 cm. long, pulverulent. Inflorescence terminal or subterminal, the solitary yellowish green flowers upon ascending 1 to 1.5 cm. long pulverulent pedicels; calyx leathery, brown pulverulent, united at the base, the 5 strap like segments radially spreading and about 6 mm. in length; petals 5, at most 3 mm. long, 1.25 mm. wide, base strongly recurved and abruptly constricted into a point, apex truncate or irregularly toothed, soft pubescent on the exterior; stamens 4 to 5 mm. long, the lower 1.5 mm. united, subglabrous, 10, fertile, the alternating appendages sterile; anthers basifixed, 0.75 mm. long, ovate, sagittate at base; ovary costate, pubescent; style glabrous especially above the middle, 3 mm. long; stigma minute, terminal; young fruit obovoid, pointed, subterete or obscurely 3-angled, 3-creased, 1 cm. long, 7 cm. in diameter, gray and felt like, normally 3-celled, with 1 to 3 seeds in each cell.

Type specimen 7569, *A. D. E. Elmer*, Lucban, Province of Tayabas, Luzon, May, 1906. Found only here and there in the woods at 800 meters on Mount Banahao.

STERCULIACEAE.

Pterocymbium gigantifolium n. sp.—Tree, 5 m. high, palm like or with only a few short branches at the top; branches thick, not rebranched. Leaves more or less crowded, soon falling and leaving large scars, rigid and scarious, shining green above, margins only slightly wavy, oblong or more properly broadly obovate, apex acute or obtuse, gradually narrowed to a small rounded or subauriculate base, 3 to 6 dm. long, 2 dm. wide above the middle, 20 to 39-nerved; the nerves ascending, with the reticulations very prominent beneath, subglabrous or with only a few stellate hairs; petiole 5 mm. thick, 1 cm. long, ferruginous pubescent; bracts brown, 4.5 cm. long, 1 cm. wide, lanceolate, sharply acuminate, slightly pubescent, hairs simple on the inner side, stellate on the outer. Inflorescence upon short recurved stalks immediately below the foliage, 2 to 4 dm. long, usually covered with short rusty brown hairs; flowering branchlets 1 to 2 cm. long, divaricate, distichously rebranched, similarly pubescent; pedicels 3 to 5 mm. long, more densely pubescent; calyx or perianth thick and leathery, wrinkled when dry, with a very short rusty brown pubescence on the exterior, 15 mm. long, about 8 mm. in diameter, cup shaped, half way divided into 5 acute segments which ultimately recurve and expose the dense bristle covered inner surface; these bristles are conspicuously lighter brown, and in the bud state are turned toward the center; filaments less than 1 mm. long, glabrous, united; anthers 10, set parallel in a single series, forming a flattened knob like cluster, 1.75 mm. long, the ends inwardly bent, attached or loosely grown together along the ventral side, longitudinally dehiscing; pistillate flowers not seen; immature pods or fruits 3, hard, pulverulent or velvety brown, lunate, 9 cm. long, 2 cm. wide, equally tapering toward both ends, flattened, apparently 1-celled; seeds smooth, 12 to 15, elliptic, 1 cm. long, 6 mm. in diameter, arranged along the concave inner edge which is brown ciliate, the inside of the pod otherwise glabrous.

Type specimen 9424, *A. D. E. Elmer*, Palo, Province of Leyte, Leyte, January, 1906.

DILLENIACEAE.

Saurauia merrillii n. sp.—Shrubs 3 m. high; branches lax, soon becoming glabrous brown. Leaves membranous, oblanceolate, very variable in size, the average ones 15 cm. long and 4 cm. wide, flat, membranous, with recurved acuminate tips, the base cuneate, much lighter green beneath, with brown ciliate adpressed hairs, the 9 to 13 pairs of ascendingly arched nerves quite conspicuous and more densely pubesent beneath; petiole varying from 5 to 25 mm. long, it as well as the leaf bearing branchlets bristly brown pubescent. Inflorescence pendulous, immediately beneath the leaves or from the lower leaf axils, upon slender 3 to 5 cm. long peduncles covered with a brown pubescence; panicles short but with slender pedicels, about 6-flowered, frequently with very fine much shorter sterile pedicels or bracts bristly covered with crisp brown hairs; calyx 5 mm. long, oblong or strap like; the 5 segments united at the base, persistent, the dorsal middle portion bearing 3 mm. long crinked ciliate hairs; corolla united at the very base, deciduous and falling intact, delicate, white, 7 mm. long, oblong to obovate, rounded at apex or subtruncate; stamens about 18, inserted upon the base of the corolla rim and falling with it; filaments 2.5 mm. long, rather thick, brown when dry; anthers versatile, with a conspicuous bend at the point of attachment. introrse, 2 mm. long, 0.75 mm. wide, ends truncate or obscurely bifid, light yellow; ovary glabrous, conical, apparently bristly hairy on the inside, 3-celled, each cell with a pendulous cluster of numerous seeds; styles also glabrous, 3 mm. long, split nearly to the base into 3 arms: stigmas small, capitate.

Type specimen 7350, *A. D. E. Elmer*, Palo, Province of Leyte, Leyte, January, 1906. In dry soil of woodlands at 250 meters. It is intermediate between *S. luzonensis Merr.* and *S. clementis Merr.* but distinct from either. Named after *Mr. E. D. Merrill.*

Saurauia sparsiflora n. sp.—Tree, 6 m. high; branches widely spreading, forming an umbrella shaped crown, the bark gray. Leaves numerous, oblanceolate, the lower one half subentire, the upper obscurely denticulate, glabrous on both sides except the scurfy midrib beneath, subcoriaceous, flat, darker green above, the 5 to 9 arching pairs of nerves brown and quite evident beneath, reticulations of the same color. very variable in size, apex obtusely rounded or acute, base cuneate, the normal ones 10 cm. long by 4 cm. wide above the middle; petioles 5 to 20 mm. long, sparsely covered with minute grayish white scales which also cover the leaf bearing portion of the twigs. Flowers chiefly in the axils of the leaves, solitary or occasionally 2 or 3-clustered, peduncles 1 to 3 cm. long, scurfy, slender, usually curved near the top; pedicels 3 to 5 mm. long or nearly obsolete, subtended by minute bracts; calyx glabrous, the 5 segments unequal, the larger ones shorter than the petals; corolla 15 mm. in diameter, also united at the base, the 5 segments oblong to elliptic with rounded apices, white; stamens many, inserted upon the corolla rim; filaments 2 mm. long, glabrous; anthers light yellow, versatile, much curved, 2.5 mm. long, 1 mm. wide, ends bifid; ovary corrugated, glabrous, about 3 mm. long, thick and worm shaped, 3, nearly divided to the base, arising from the central cavity of the broad truncate apex of the ovary; stigma capitate, darker brown, small; mature berry wrinkled, its seed reticulately faveolate.

Type specimen, 8364, *A. D. E. Elmer*, Baguio, Province of Benguet, Luzon, March, 1907. This *Saurauia* was discovered in oak woods of Mount Santo Tomas at 2250 meters and is the most alpine species known in the Philippines. It could be confused with *S. subglabra Merr.*, were it not for the more numerous and smaller leaves, and 3-celled ovaries.

THEACEAE.

Adinandra coriacea n. sp.—Scandent or epiphytic and forming bushes in the limbs of large trees; branches gray, smooth, quite rigid, short but comparatively many branched. Leaves clustered or subverticillate at the end and the base of the two or three year old growths, alternate, easily detached, leaving conspicuous scars, thick and rigid, lucid green, brown beneath when dry, entire margins inclined to turn under, oblanceolate, quite variable, the average 7 cm. long by 2 cm. wide above the middle, apex rounded or obtuse, base gradually attenuate to the 1 cm. long petiole, glabrous, lateral nerves not visible. Flowers solitary, also alternate, usually arranged beneath the terminal cluster of leaves, but occasionally arising from the leaf axils, pendulous, yellow, deciduous; pedicels about 1 cm. long, glabrous, recurved near the apex; calyx united at the base, persistent, very rigid, 5-segmented or with one or two additional small basal bracts, 5 mm. long, imbricate, the segments elliptic; petals of the same number, united at the base, early falling out as a whole, the segments broadly oblong, with rounded apices; stamens many, inserted upon the corolla rim; filaments 0.5 mm. long, glabrous; anthers at least 1 mm. long, oblong or broadest at the base, apex obtuse, the entire length grown to the filament; style tapering to the apex which is 2-cleft; ovary glabrous, conical, 2-celled, about 10 ovules in each cell; fruits not seen.

Type specimen 7438, *A. D. E. Elmer*, Lucban, Province of Tayabas, Luzon, May, 1906. Rare in woods of Mount Banahao at 900 meters.

Eurya myrtilloides n. sp.—Rather slender erect trees, 8 m. high; wood white, moderately hard; bark dark brown, densely covered with similarly colored lenticels; branchlets very numerous, fastigiate or ascending, glabrous, mostly green, ridged, flexible. Leaves alternate, leaving prominent scars, numerous, subcoriaceous, dull green above, lighter beneath, elliptic or frequently obovate, obtusely tapering at the base, apex rounded, about 2 cm. long, 1 cm. wide across the middle, subsessile, glabrous, dotted beneath, margins subentire or crenately toothed and subinvolute; midvein prominent beneath, caniculate above, usually terminated into a minute callous brown point, lateral nerves barely visible; stipule persistent, smooth, brown, acute, 1.5 mm. in length. Inflorescence from the lower leaf axils, glabrous, 1 to 2 cm. long, ascending, usually with only 1 stalk but occasionally with 3 from the same leaf axil, single or corymbosely paniculate; peduncles many bracteate; the bracts very similar to the stipules except a trifle smaller; pedicels ascending, slender, subtended by persistent bracts and usually bibracteate toward the apex, about 5 mm. long; calyx subpersistent, with a prominent 2 to 3 mm. long stipitate base, glabrous; its 4 lobes united at the base, 2 mm. long, imbricate, rather thick, ovately obtuse; corolla also glabrous, creamy white, 3.5 mm. long, united below the middle; its 4 lobes broadly rounded, spreading, strongly curved upon the upper side; stamens 4, alternating with the corolla segments and inserted upon its throat; filament glabrous, 1 mm. long, brown; anther broadly oblong, with subtruncate ends, as long as its free filament; ovary glabrous, sessile upon a succulent rim, apiculate at the apex; fruit globose, 5 mm. in diameter, 4-celled; seeds stony, entirely filling the cells, solitary, the ventral 2 sides plane, the dorsal side concave, smooth.

Type specimen for fruit 7784, for flower 9105, *A. D. E. Elmer*, Lucban, Province of Tayabas, Luzon, May, 1907. Only at the summit of the lesser peak of Mount Banahao where it is quite common. The writer has also collected it on the summit of Mount Santo Tomas, Province of Benguet, Luzon.

VIOLACEAE.

Viola rupicola n. sp.—Biennial to perennial herbs; caudex short, sparingly branched, suberect or decumbent, 2 to 3 mm. thick. Leaves crowded toward the ends, very variable in size, spreading, ovate, with cordate bases, apex obtuse, the normal ones 18 mm. wide and 24 mm. long, thin, flat, margins crenate, strigose above, glabrous beneath except the 3 pairs of lateral nerves and the midvein which are also strigose; petioles much varying in length, the longer ones 5 cm., slender, usually strigose; stipule brown, with broad bases but with very slender tips, subpersistent; peduncles from the upper leaf axils, strigose, ultimately equalling the longer leaves, usually with 2 opposite linear bracts at about the middle; flowers deflexed, inconspicuous; calyx glabrous, 3 mm. long, linear lanceolate, 3-nerved, rather straight, united at the base, each of the 5 segments provided at the base with a 0.5 mm. long blunt spur; petals less than one half the calyx length and alternating with them, linear to spatulate, subequal; stamens 5, opposite the sepals; filaments flattened, 0.75 mm. long, extended into a conspicuous acute tip; anthers 0.5 mm. long, almost as broad, attached to the inner side of the broad connective; ovary triangularly conical, glabrous; style very thick and much curved; stigma minute, at the apex; capsule glabrous, tricarpellary, 4 mm. long, more or less rugose; seeds smooth, broadly lenticular or nearly globose, about 1 mm. long, 0.75 mm. in diameter.

Type specimen 8574, *A. D. E. Elmer*, Baguio, Province of Benguet, Luzon, March, 1907. On damp moss covered limestone ledges two miles west of this station.

FLACOURTIACEAE.

Homalium sorsogonense n. sp.—A small tree, 8 m. high, with a 2.5 dm. bole; branches lax, light gray, covered with small lenticels. Leaves diverse, chartaceous, elliptic or subrotund, crenately toothed or serrate, glabrous, the average blade 6 cm. long by 4 cm. wide, apex broadly rounded and terminated by a short blunt point, base equally rounded or sometimes obtuse; lateral nerves more numerous from near the base, ascendingly curved, more prominent beneath, reticulations also prominent; petiole subglabrous, 3 to 5 mm. in length, easily detached at the base. Spicate racemes terminal or subterminal, slender, ascending, at least 1 dm. long, in the younger state short tomentose, flower bearing from near the base; flowers creamy white, 1 to 3-clustered, subtended by small pubescent bracts; pedicels pubescent, 2 mm. long, persistent, articulate at the apex; calyx similarly pubescent, turbinate, more or less carinate, distinctly stipitate at the base; its 5 segments 2 mm. long at least, spatulate or obovately pandurate, soft, ciliate; corolla a second series of 5 perianth segments similar but usually a trifle shorter and conspicuously narrower; stamens about 10; filaments 2 mm. long, subequal, slender, glabrous or sparsely hairy at the thickened base, indefinite; anthers 0.25 mm. long, ellipsoid, inserted upon the hairy disk of the ovary, not exceeding the perianth segments; pistils about 5, hairy, the upper one half divided into 2 setae like arms; ovary 5-valved at the top, pubescent on the interior; ovules several or more, attached to the central placentae from the top.

Type specimen 7311, *A. D. E. Elmer*, Sorsogon, Province of Sorsogon, Luzon, November, 1905. On steep open mountain slopes at 400 meters.

PASSIFLORACEAE.

Passiflora philippinensis n. sp.—Scandent shrub, at the top of its support numerously branched and spreading; branches smooth, green. Leaves subpendulous, shining green above, glaucescent beneath, arranged in distichous rows along the branchlets, half leathery, oblong to narrowly ovate, obtusely rounded at the apex, base broadly rounded or subcordate, margins entire and slightly involute, glabrous above, soft tomentose beneath, deciduous, very unequal in size but not in shape, the larger ones 14 cm. in length by 4 cm. in width below the middle; the lateral nerves 3 to 5 on each side, obscure, soon divided into numerous but rather obscure reticulations; petiole 1 to 2 cm. long, soft brown pubescent. Flowers several, clustered in the leaf axils of the drooping distal ends of the slender branchlets, ascending, purplish, cymosely paniculate; peduncles stout, briefly branched once or twice, rusty pubescent; pedicels similarly pubescent, slender, parallel, about 2 cm. long, bracteate toward the base, persistent; calyx 1 cm. in diameter at the base and cup shaped, sparsely pubescent, its 5 lobes about 15 mm. long, oblong or broadly strap like, 4 mm. wide, petaloid; petals shorter and narrower, otherwise similar and of the same number, inserted upon the calyx rim; outer corona inserted upon the perianth cup, fibrilose, at least 15 mm. long; the inner corona of a ring of thick folds surrounding the broadened base of the gynophore; gynophore 8 mm. long, 3 mm. thick, glabrous, bearing the sessile ovary and terminating into 5 filaments which are glabrous and flat especially toward the base and radially spreading and ultimately recurved; anthers dorsifixed, oblong, 4 mm. long, 1.3 mm. wide; ovary ellipsoid, 3 mm. in diameter, short pubescent; styles 3, radially spreading and ultimately reflexed, nearly equalling the filaments, divided clear to the apex of the ovary, glabrous; stigma a large brown fleshy disk about 1.5 mm. in diameter.

Type specimen 8985, *A. D. E. Elmer*, Baguio, Province of Benguet, Luzon, March, 1907. In ravines along the trail from Sablan to the barrio of Yagyadan. The slender ultimate drooping branchlets festoon the shrubberies over which it forms tangled masses. Not rare but only observed in this locality.

MYRTACEAE.

Eugenia succulenta n.sp.—Erect tree, 18 m. high, with a 5 dm. thick bole; branches comparatively short, bushy, rigid; branchlets smooth, grayish, crooked and gnarly. Leaves opposite, separating while drying, coriaceous, lucid green above, glabrous, numerous, flat or conduplicate upon the upper side, the medium blades 9 cm. long, 4 cm. wide across the middle, oblong, apex abruptly terminated by an obtuse point, base subcuneate or obtuse; petiole 5 mm. long, stout, glabrous, dark brown when dry, nerves not prominent beneath, 5 to 7 on each side, ascending and submarginally united. Inflorescence terminal, short rigidly paniculate, 3 to 9-flowered; flowers deciduous, white, somewhat succulent; the pedicels 3 to 5 mm. thick, articulate; calyx smooth, turbinate, 1.5 cm. long, about as broad across the top; the 4 lobes 5 mm. long, ovately rounded to obtuse, with membranous margins; corolla glandularly dotted on the outer side, more membranous, orbicular, with broad bases inserted upon a prominent rim of 4 free petals, edges entire and hyaline, imbricately overlapping, 1 cm. across, subpersistent; stamens very numerous, 1 to 2 cm. long, slender, glabrous, also inserted upon the ovary rim, ultimately interlaced; oblong anthers less than 2 mm. long, and 1 mm. thick; style also glabrous, equalling the stamens, fleshy, brown when dry, frequently glandular, gradually thickened from base to the small terminal stigma.

Type specimen 8621, *A. D. E. Elmer*, Baguio, Province of Benguet, Luzon, March, 1907. The author collected it in the same place in 1904 and it is otherwise unknown. It belongs to the section *Jambosa*.

Eugenia sablanensis n. sp.—Slender tree, 6 m. high, with smooth grayish white bark and comparatively hard wood; branches spreading, smooth, yellowish gray. Leaves opposite, very leathery, mostly flat, beautifully shining deep green above, duller and yellowish green beneath, entire margins subinvolute, oblong to obovate, the medium sized ones 13 cm. long, 6 cm. wide, apex broadly rounded with a very short obtuse point, base obtuse to subcuneate; petiole glabrous, 1 to 2 cm. long; nerves 19 to 23 pairs, faint, rather straight and parallel, submarginally united, the midrib very prominent beneath, reticulations none. Inflorescence fragrant, terminal, corymbosely paniculate; main peduncles glabrous, angular, 1.5 to 3 cm. long; its branches opposite, ascending, subtended by rigid acuminate bracts, the ultimate ones usually bearing 5 flowers; pedicels of flowers 2 mm. long, divaricate, subtended by an acute bract; calyx green, 4 mm. long campanulately elongated or the basal portion tubular, 3 mm. across at the truncate or 4-apiculate rim, subtended by 2 rigid acute bracts; petals free, pale green, elliptic to orbicular, about 4 mm. across, 4 in number, strongly convex on the exterior side, calyptrately deciduous; stamens pale yellow, numerous, falsely united at the base and inserted upon the ovary disk; filaments very unequal in length, the longer ones 4 mm. long, glabrous, more or less flattened; anthers ovoid, 0.75 mm. long, basifixed; straight style also glabrous, a trifle longer than 2 mm.; fruit not seen.

Type specimen 8879, *A. D. E. Elmer*, Baguio, Province of Benguet, Luzon, March, 1907. The Igorrotes call it Pelio and report the fruit edible. In woods on the trail one mile below the barrio after which it is named. Leaves similar to *E. densinervia Merr.*, section *Syzygium*, but the inflorescence is more compact, more numerously flowered and the individual flowers only one half as large as 1249 of *Dr. H. N. Whitford* from the Lamao river, Mount Mariveles, Luzon.

Eugenia curtiflora n. sp.—Tree, with leaf scars gnarly, yellowish gray branchlets. Leaves opposite, coriaceous, oblanceolate, the normal blades 11 cm. long, 4 cm. wide above the middle, the entire margins involute, base attenuate, or subcuneate, apex abruptly contracted into a short acute or abtuse recurved point, glabrous, smooth and darker green above, punctate glandular beneath, nerves 9 to 11 pairs, oblique, parallel, submarginally united, quite evident beneath, the midvein very prominent beneath, brown and also glandular beneath, reticulations very obscure; petiole 1 cm. long strongly caniculate above, glabrous, reddish brown when dry, thickened toward the base. Inflorescence lateral, in the axils of the leaf scars, curt; the cymose panicle 3 cm. wide, upon a very thick 8 mm. long peduncle, usually bracteate at the base, secondary peduncles shorter, subangular, subtended by rigid obtuse bracts; flowers pale yellow, sessile, usually 3-clustered; calyx very thick and rigid, subtended by a whorl of persistent obtuse bracts, punctate glandular, 5 mm. long, at least that much across the nearly truncate or shallowly 4-toothed top, turbinate; petals 4, free but strongly overarching and forming a calyptrate hood which is pushed off by the numerous stamens, unequal, orbicular or rotund, also glandular; filaments glabrous, subterete, fleshy, very unequal in length, the longer ones 5 mm. long; anthers oblong, 0.75 mm. long, dorsifixed; styles thick, fleshy, about equalling the longer stamens, the stigmatic portion pointed; fruits not seen.

Type specimen 8768, *A. D. E. Elmer*, Baguio, Province of Benguet, Luzon, March, 1907. Apparently belonging to the *Syzygium* section.

Eugenia leytensis n. sp.—Erect tree, 8 m. high, with a round top; branches widely spreading, the ultimate ones strongly 4-angled or 4-winged, smooth, yellowish gray, sparingly rebranched, quite rigid. Leaves flat, horizontally spreading, subcoriaceous, lucid green above, much paler and brown punctate below, the lateral ones few, branchlet opposed and smaller, the larger ones in a single pair terminating the twigs, apex obtuse, base rounded, not auricled, oblong or the smaller ones oblanceolate, the normal ones 2 dm. long by 7 cm. wide, glabrous on both sides; petiole very thick, about 5 mm. long. caniculate along the upper side; nerves 13 to 19 pairs, straight, oblique, parallel, united at their ends forming a submarginal nerve, midnerve very prominent beneath and deeply caniculate on the upper side, reticulations obscure. Flowers sessilly clustered along the twigs and branches, clusters very unequal in size, nearly contiguous on the most floriferous branchlets; the basal portion of the calyx much constricted and subcompressed, the upper portion campanulate or subturbinate, in all 1.5 cm. long, the interior strongly funnel shaped; its 4 segments persistent, more or less twisted and recurved, broadly rounded, about 4 mm. long; petals rotund, free, about 6 mm. long and 5 mm. wide, 4 or 5, widely spreading and subpersistent; stamens very numerous, also subpersistent, 15 mm. long, nearly equal; filaments slender, glabrous, dark brown when dry; anthers versatile, nearly rotund in outline, 0.5 mm. long; style glabrous, fleshy, terete, equalling the stamens, slenderly tapering toward the apex; fruits not seen.

Type specimen 7263, *A. D. E. Elmer*, Palo, Province of Leyte, Leyte, January, 1906. In light woods of bottom lands near the Bangon River. It belongs to the section *Jambosa* and apparently is closely related to *E. malaccensis Linn.*

ARALIACEAE.

Schefflera piperoidea n. sp.—An epiphyte; stems light gray, with soft wood. Leaves few, alternate, trifoliate, mostly toward the ends of the comparatively few branches; petiole 3 to 5 cm. long, the basal end at least much thickened and with a corky crest, terete, glabrous, axillary bract 6 mm. long, acute, persistent, corky; petiolules 1 to 2 cm. long, the terminal one usually longer; blade subinequilateral, flat and rigid, the apex abruptly contracted into a very slender acuminate point, the base acute, tips recurved, glabrous, darker green above, lanceolate to oblong, variable in size, the lateral ones a trifle smaller; primary nerves 5 to 9 on each side, the basal ones much ascending, alternating with quite prominent secondary ones, reticulations equally prominent on both sides. Infrutescence always terminating the branches, of 1 to 3 or even 5 spicate racemes which in the fresh state are quite rigid and divaricately spreading, 5 to 15 cm. long but fruit bearing only along the distal one half; the peduncles subglabrous, subtended by stiff acuminate bracts; drupes upon 1 to 3 mm. long pedicels, usually aggregated in small clusters, obovoid, 5 mm. long, a trifle narrower toward the apex which is broadly truncate, lemon yellow.

Type specimen 7461, *A. D. E. Elmer*, Lucban, Province of Tayabas, Luzon, May, 1906. In woodlands of Mount Banahao from 700 to 1000 meters. Its fruits and foliage are remarkably suggestive of some species of *Pipers*.

Schefflera longifrutescens n. sp.—A much branched epiphyte upon limbs of large trees; branches smooth, yellowish gray, rather crooked and rigid. Leaves alternate, trifoliate, quite variable in size and shape; peduncles quite thick, 3 to 13 cm. long, terete, glabrous, with corky corrugations at the base stipule or axillary bract rigid, obtuse, 6 mm. long, persistent; blade coriaceous, elliptic to oblong, glabrous, nerves faint, apex abruptly contracted to an acute point, base obtusely rounded, the obscure reticulations equally visible on both sides, the terminal leaflet larger and usually oblong, 15 cm. long by 7 cm. wide, the lateral ones much smaller and elliptic; petiolule articulate, the lateral ones 2 cm. long, the terminal one longer. Infrutescence chiefly terminal, 1 to 3-clustered, 2 to 3 dm. long, spicate and subpendulous, glabrous; fruits upon slender 7 mm. long glabrous pedicels, 1 to 3 in a cluster or occasionally arising from short peduncles; berries broadly elliptic, yellow but soon becoming reddish, 5 mm. thick, gray apex truncate, 4-seeded, apparently only 2 maturing; pyrene 3.5 mm. long, oblong, compressed, straw color.

Type specimen 7354, *A. D. E. Elmer*, Palo, Province of Leyte, Leyte, January, 1906. Forming rigid bushes upon trees at the rapids of Bangon River two miles above Palo. The fruits were eagerly eaten by the birds.

Anthrophyllum sablanense n. sp.—Unbranched trees, 10 m. high with brownish gray bark and soft wood containing a large pith. Leaf rachis 1 to 2 m. long, divaricate or the older ones descending; true petiole only 3 to 6 dm. long, its base thick and flattened, closely set upon one another, leaving much flattened almost winged scars after falling; leaflets coriaceous, lucid green above, paler beneath, glabrous, strongly conduplicate on the upper surface, usually with recurved tips, finely involute margins undulate or twisted, quite variable in size, an average blade 2 dm. long, one half that across below the middle, ovate to oblong, the base broad, rounded or obtuse and inequal, apex abruptly acute and mostly curved to one side; nerves 5 to 7 pairs, though irregular; petiolules ascending, arising from the articulate thickened nodes, 2 to 4 cm. long, glabrous, quite thick, also articulate. Inflorescence in the upper leaf axils, as long as the leaves but more erect and spreading over them at the top, the smooth, green stalk provided with 1 to 3 pairs of small opposite leaves; corymbs 1.5 to 3 dm. across, 2 to 3 umbellately divided, upon glabrous 1 dm. long peduncles which are usually 3-branched; pedicels 10 to 1.5 mm. long, spreading, also glabrous; fruits light olive green when fresh, with a darker green pointed cap, elliptic or obscurely flattened, 1 cm. long, 8 mm. wide, smooth, 1-celled, 1-seeded, seed suborbicular or somewhat flattened toward the apex the place of attachment.

Type specimen 8958, *A. D. E. Elmer*, Baguio, Province of Benguet, Luzon, March, 1907. A few trees of this species were found in half swampy woods at Balete a small barrio three miles west of Sablan.

LOGANIACEAE.

Strychnos luzonensis n. sp.– Scandent shrub, with rigid and ultimately, slender terete branchlets; stems 2.5 mm. thick; wood solid and very tough, with smooth light gray bark, or brown on the twigs. Leaves opposite, scattered along the branchlets, chartaceous to glabrous, ovately lanceolate to lanceolate, tips slightly recurved, lucid green but darker on the upper surface, apex acuminate, base acute to short obtuse or rounded, 10 cm. long, 4 cm. wide or frequently smaller, with entire margins; petiole dark brown when dry, glabrous, 1 cm. long; nerves more prominent beneath, parallel, the narrower leaves with only a single pair, the broader ones with an additional rather faint pair of nerves, reticulations quite evident beneath. Corymbose panicle terminal, ternately branched from the base, glabrous, about 1 dm. long and as wide, yellowish brown puberulent, but soon becoming glabrous; the branchlets, peduncles and pedicels subtended by small setaceously pointed bracts; flowers creamy white, subsessile or upon slender 3 mm. long pedicels, 1 to 3 clustered; calyx subglabrous, united at the base, edges finely ciliate, persistent; the 5 lobes 1 mm. long, obtusely rounded; corolla falling as a whole, 2 mm. long, glabrous except the fringe of hairs around the throat; its 5 segments adnate in bud, 3-nerved, the upper two thirds free portion thicker and bluntly obtuse; stamens, also 5, alternating with the segments and inserted upon the corolla throat; filaments glabrous, about 0.75 mm., in length; anthers basifixed, cordate, 0.5 mm. long, equally as wide across the base; ovary short ovoid or subglobose, sessile, subglabrous, gradually tapering to the strict sparsely hairy 1 mm. long style terminated by a minute stigma; fruits when collected hard and green, globose or short obovoid, 2 to 3 cm. thick, the surface more or less punctate.

Type specimen for fruit 7885 and for flower 8251, *A. D. E. Elmer*, Lucban, Province of Tayabas, Luzon, May, 1907. The narrow leaved or fruiting specimen was collected in light thickets at 700 meters; the broad leaved or flowering specimen was found in humid woods at 500 meters between Lucban and Sampaloc. Very similar to *S. angustiflora Benth.* from the Island of Hongkong, China, and to *S. multiflora Benth.*, an endemic species of the Philippines. From the latter it can be distinguished by its smaller leaves and flowers, by its terminal corymbose panicle and with the individual flowers not in congested clusters.

APOCYNACEAE.

Voacanga plumeriaefolia n. sp.—A tree about 10 m. high; branches not numerous, spreading, rather thick; wood soft, white; sap in bark very viscid, whitish. Leaves opposite, scattered along the scarcely branched watery twigs, few but horizontally spreading, quite variable in size, the smaller ones nearly elliptic, the others oblong, lucid green above, the medium sized ones about 3 dm. long and 11 cm. wide, rigid, succulent, very hard to cure, equally tapering at both of the acute or obtuse ends, glabrous, the entire margins slightly involute, pinnately nerved into 13 to 17 divaricate pairs and quite prominent beneath, reticulations not evident; petiole 1 to 3 cm. long, glabrous; stipule stiff, triangular plates, adnate to the base of the petiole and branch. Nuts solitary or in pairs, upon simple or sparingly branched pendulous stalks arising from the leaf axils or from the axils of fallen leaves along the branchlets, curved, subglobose, 6 to 9 cm. long, deep orange red, hard, smooth, the thick fleshy portion freely bleeding with a very gummy white substance; the peduncles and pedicels very rigid and thick, seeds several, cylindric, 15 mm. long, 6 mm. in diameter.

Type specimen 7502, *A. D. E. Elmer*, Lucban, Province of Tayabas, May, 1906. In woodlands from 500 to 800 meters, usually in very humid half swampy regions. Flowers were observed to be tubular, succulent, and creamy white. This species is not to be confused with the more common and shrubby *V. cumingii Rolfe* which has thinner, much smaller and differently shaped leaves.

CONVOLVULACEAE.

Rivea glabrata n. sp.—Scandent shrub, up to 20 m. upon trees; stems and branches flexible and disposed to twine, the bark with small longitudinal ridges. Leaves exceedingly variable in size but not in shape, the average normal size 17 cm. long and 11 cm. wide below the middle, ovate, acute at apex, base cordate, coriaceous, pleasing green above, much paler beneath, flat, glabrous; nerves about 5 on each side, ascendingly arching, dark brown when dry, subglabrous; petioles 6 to 10 cm. long, subglabrous, usually twisted and easily detached at the base. Infrutescence mostly toward the ends of leafless branchlets, hanging free from the foliage branchlets, subumbellately disposed at the ends of 15 cm. long glabrous peduncles; pedicels suberect, 1 to 1.5 cm. long, in clusters of 3 to 5, the 5 calyx segments persistent, deflexed, 6 mm. long, rounded at the apex, rigid, the outer central portion pubescent, the thin overlapping margins glabrous; fruits globose or only slightly elongated. about 1 cm. thick, smooth and shining, of a pleasing purple coler, set upon a narrow dark brown disk; nut 8 mm. in diameter, orbicular. hard. Flowers not seen.

Type specimen 8923, *A. D. E. Elmer*, Baguio, Province of Benguet, Luzon, March, 1907. In woods near the barrio of Sablan. The Igorrotes call it Denodakto and its stems are used in tieing fencings and the lighter frame work of their houses.

Rivea cinerea n. sp.—Shrub, climbing tall trees; stems and branches flexible, smooth, green or yellowish when old, the ultimate twigs soft cinereous pubescent and disposed to twine. Leaves soft, rather membraneous, roundly ovate, 15 cm. long excluding the petiole, almost as wide below the middle, apex abruptly acute, base deeply cordate, soft cinereous pubecent but especially so beneath; nerves 8 to 10 pairs, the basal 4 pairs arising approxmimately from near the base and divaricate or the lowest ones recurved, the upper pairs ascending; petiole 6 mm. long, similarly pubescent, easily detaches at the base. Infrutescence upon 3 to 9 dm. long erect branches; peduncles 1 to 7 cm. long, short pubescent, usually divaricately branched by twos; pedicels thickened especially toward the apex, 1 to 1.5 cm. long; calyx 8 mm. high, spreading, twice that across, leathery, pubesent on the outside, the overlapped margins thin and glabrous, 5, broadly elliptic and with rounded apices; fruits pendulous or subpendulous, shining smooth and purple, nearly 2 cm. long and 1 cm. in diameter, ellipsoid. sessile upon a broad rim; stone hard, smooth, 1 cm. long, 6. mm. thick, ellipsoid.

Type specimen 8882, *A. D. E. Elmer*, Baguio. Province of Benguet, Luzon, March, 1907. Near Sablan. It sprawls over the tops of trees and large shrubs and forms tangled masses. The Igorrotes call it Quahal and its stems are used for tieing purposes.

Merremia similis n. sp.—Subscandent and sprawling; stems and branches slender and wiry. Leaf blade 2 dm. long, fully as wide, the basal cordate sinus broad and rounded, apex abruptly tapering to a slender acuminate point, margins entire, subinvolute, subcoriaceous, glabrous above or with only a few strigulose hairs, beneath soft dirty yellow pubescent and much paler, flat, horizontally disposed, petiolate; nerves 14, the lower 3 pairs from near the base and divaricate, the upper 4 pairs oblique, prominent beneath, the larger ones above caniculate, the cross bars beneath also conspicuous. Inflorescence short corymbosely paniculate; peduncles terete, 5 mm. thick, short rusty pubescent when in the young state, ultimately becoming glabrous, rigid, 3 to 6 dm. long; secondary peduncles averaging 1 cm. in length, densely matted with short rusty brown hairs, stout, terete, but usually upwardly curved; pedicels 3 to 5 cm. long, articulate, becoming subglabrous, gradually thickened toward the apex; flowers delicate, large, white with a tinge of red; corolla glabrous, subcampanulate, with 5-lobed margins; bracts reduced to a thick rim; sepals inequal, convex and imbricate, persistent, 5, the outer 2 or 3 about 2 cm. long and enclosing the inner ones, scarious, smooth, brown on the outer side, somewhat lighter on the inner sides, obovate or ovate to broadly elliptic, the body rather thick with thin margins, style 2.5 cm. long, very slender, glabrous; stamens not observed; capsule ovoid, smooth and dark brown on the exterior, velvety white on the interior, 1.5 cm. long, bursting from the apex, united at the base, seed hard, nearly black, 6 mm. across, the inner 3 sides plane and covered with short blackish hairs, the outer concave side and specially along the edges densely covered with long persistent similarly colored hairs.

Type specimen 7341, *A. D. E. Elmer*, Palo, Province of Leyte, Leyte, January, 1906. Similar to the orange yellow glabrous *M. nymphaeifolia Hallier* which is more common in our locality.

VERBENACEAE.

Callicarpa paloensis n. sp.—Erect tree, 9 m. high, with an umbrella shaped crown; branchlets pulverulent, melleus yellow. Leaves opposite, scattered along the branchlets, broadly lanceolate, coriaceous, flat, margins entire and involute, the young ones stellately pubescent on the upper surface but ultimately becoming glabrous, beneath melleus and densely covered with short stellate hairs, the upper portion gradually tapering into a sharply acuminate point, base similarly tapering, attenuate or cuneate, the normal blades 18 cm. long, 6 cm. wide; petiole strict, 2 cm. long, grooved, similarly colored and pubescent, ascending; nerves very prominent beneath, on each side 9 to 11, ascendingly curved, cross bars quite conspicuous. Inflorescence terminal and subterminal or from the upper leaf axils, ascending in flower; peduncle 3 to 5 cm. long, pubescent, the secondary ones repeatedly shorter and thinner, each pair of branches subtended by bracts; flower pink, glomerate, subsessile; calyx turbinate, 1 mm. long, as broad across the truncate top, quite rigid, thickly clothed with masses of stellate hairs, perigynous; corolla 2.5 mm. long, campanulate, inserted upon the base of the calyx, glabrous, terminated by 4 round lobes which are 0.75 mm. long, abruptly constricted near the base, stamens 4; filaments slender, glabrous, inserted upon the throat of the constriction, a few mm. exceeding the corolla, flexuose; anthers oblong, 1 mm. long and 0.5 mm. thick; style also flexuose, slender, glabrous, a trifle exceeding the stamens, stigmatic portion flat and broadly expanded; ovary small, finely pubescent; fruit or berry 4-celled, composed of 2 carpels, globose, 2 mm. in diameter, bright pink; stone like seeds 1 in each cell, 1.75 mm. long, 1 mm. thick, tapering toward both ends, the outer side convex, the 2 lateral sides plane.

Type specimen 7370, *A. D. E. Elmer*, Palo, Province of Leyte, Leyte, January, 1906. A fine tree in light wood at 300 meters.

Callicarpa subalbida n. sp.—Suberect shrub, 4 m. high; wood soft, white, covered with light or ashy gray bark; the ultimate branchlets slender, more or less 4-angled. Leaves opposite, about 5 cm. apart, glabrous, dull green above, silvery white beneath, submembranous, the larger blades 2 dm. long and 6 cm. wide below the middle but frequently smaller, the upper one half gradually tapering to a slenderly acuminate point, the base subcuneate, margins entire, broadly ovate lanceolate to oblong; petiole nearly 2 cm. long, stout, ashy gray, wrinkled when dry, subglabrous or only slightly scurfy; veins 7 to 9 on each side of the prominent midnerve, ascendingly curved, quite prominent beneath, the connecting cross bars rather numerous. Inflorescence from the upper leaf axils, dichotemously branched, 6 cm. wide, 4 cm. long, gray, finely scurfy, its branches subtended by linear 5 mm. long bracts; peduncles yellowish lanose; flowers yellowish white, sessile, caducous, 3 to 5-clustered upon a woolly receptacle surrounded by a subwhorl of unequal lanose persistent involucral bracts; calyx strongly turbinate, nearly 2 mm. long, 1.5 mm. thick across the apex which is either subentire or obscurely 4-apiculate, pubescent; corolla nearly 3 mm. long, cup shaped, inserted upon the calyx at about the middle, glabrous, its 4 lobes 1 mm. in length and obtuse at apex; stamens 4, only slightly protruding; filaments slender, glabrous, the base adnate to the corolla, 2 mm. long, with a strong bend below the middle; anther 1.25 mm. long, 0.75 mm. wide, oblong, basifixed, apex emarginate, base subcordately lobed, glutinous and covered with pale yellow granules along the connective between the cells on both sides; ovary subglobose, 0.75 mm. thick, the basal portion glabrous, the upper portion densely covered with sulphur yellow grains; style if straight 4 mm. in length, glabrous, a conspicuous double loop below the middle; stigma subdisciform, terminal; berry smooth, blackish when dry, 2 mm. thick globose, one half surrounded by the calyx cup.

Type specimen 9184, *A. D. E. Elmer*, Lucban. Province of Tayabas, Luzon, May, 1907. In humid woods at 500 meters on the road between Lucban and Sampaloc.

LABIATAE

Stachys rubisepala n. sp.—Biennial herbs, 3 to 5 dm. high; stems many from the root, erect or the outer ones suberect, sparingly branched, brown glandular pubescent. Leaves chiefly cauline, quite numerous, evenly scattering clear to the base, variable in size and shape, membranous, soft pubescent especially beneath, the smaller ones lanceolate, the normal ones ovate to elliptic, obtuse at both ends, the blade 15 mm. wide and 2 to 3 cm. long with 3 to 5 fine ascending nerves; petiole pubescent, about 5 mm. long. Inflorescence scattering along the stems, at irregular intervals, in rather dense 2 cm. thick whorls subtended by foliaceous bracts, bristly pubescent with ciliate hairs; the 3 to 5 slender pedicels similarly pubescent, usually grouped upon very short peduncles, subtended by very linear 5 mm. long bracts; calyx only slightly curved, the upper portion red when in anthesis, 2 mm. thick, tubular, covered with whitish bristle like hairs on the exterior, 5 mm. long including the 2 mm. long teeth, about 13-nerved; teeth sharply acuminate, equal, the lower two a trifle longer and split down the base; corolla 6 mm. long, straight, subglabrous, gradually tapering toward the base, 2-lipped; the lower one broadly 3-lobed, the upper subentire or emarginate and nearly as long; stamens 4, inserted a trfle below the throat of the corolla tube; filaments glabrous, subequal in length; anthers widely spreading, about 0.5 mm. across; style exceeding the stamens, glabrous, clavate, or divided into a few subequal lobes, circinate in the young state; seeds 4, lenticular, about 0.75 mm. across from the side, smooth, hard.

Type specimen 8408, *A. D E. Elmer.* Baguio, Province of Benguet, Luzon, March, 1907. Quite common in damp soil along the trail up to Mount Santo Tomas at 2,000 meters. The genus has not been reported previously from the Philippines.

Gomphostemma luzonense n. sp.—Branched herbs, 1 m. high; stems pulverulent or the younger portion short pubescent, quadrangular. Leaves opposite, more crowded toward the ends of the stems and branches, the average blade 2 dm. long, 7 cm. wide, the shallow crenate teeth with cuticular tips, membranous, paler green beneath, glabrous above, short pubescent beneath on the nerves and reticulations, apex acute, base obtuse, the 5 to 7 lateral nerves of each side much ascending, cross bars quite prominent beneath; petiole 5 cm. long, short yellowish pubescent. Inflorescence in the leaf axils or in the axils of their scars further down the stems, in 1 to 3 whorls; bracts short pubescent, very unequal in size and shape; calyx 8 mm. long, similarly pubescent on the exterior, the apical portion spreading into 5 broadly ovate teeth, its nerves carinate toward the apex and extended into acuminate recurved tips; corolla white, 2-lipped, the portion exceeding the calyx pubescent on the outer sides; the lower lip nearly straight, 6 mm. long, oblong, 3 to 5-nerved, the apex shallowly toothed or emarginate; the upper lip strongly reflexed, equal in length but broader than 6 mm. at the base, 3-lobed; the lateral lobes shorter, rounded, truncate or irregularly jagged; filaments straight, loosely united, slightly woolly, unequal, each of the four bearing a fertile anther; anther cells elliptic, nearly 1 mm. in diameter, downwardly tipped; style glabrous, equalling the longer stamens, twisted at the base, bearing a cleft stigma: seeds or nuts 4, oily, black, obscurely triangular or nearly lenticular, 5 mm. long, about 3 mm. wide, rounded at apex, slightly united at the base.

Type specimen 7433, *A. D. E. Elmer*, Lucban, Province of Tayabas, Luzon, May, 1906. This, the second endemic Philippine species, grows in damp fertile soil in shaded ravines at 550 meters.

Leucas sericea n. sp.—Biennial herbs, 3 to 5 dm. high, stems angular, lanose, mainly branched from the middle; branchlets ascending. Leaves quite variable in size, ovate to elliptic, serecio tomentose especially beneath, shallowly dentate, with 3 to 5 ascending nerves, the average ones 2 cm. wide by 4 cm. long, obtuse at apex, base rounded, with a 1 cm. long petiole. Flowers snow white, not numerous in terminal or axillary clusters, sessile; calyx subtended by 3 to 5 mm. long setaceous bracts, nearly straight, narrowed toward the base, 8 to 10 mm. long, 4 mm. wide toward the top, bristly hairy on the exterior, pubescent in the region of the throat on the interior, 10-nerved; the 10 teeth straight, also ciliate pubescent, setaceously acuminate, the larger series 2 mm. long, those alternating with them a trifle shorter; corolla 15 mm. long, nearly straight, its glabrous tube slender, the throat divided for 5 mm. into 2 lips; the upper lip obovate, densely clothed with soft ciliate hairs on the upper side; the lower one a trifle deflexed, subglabrous or glabrous and finely ciliate along the margins only, broadly 3-lobed, the lateral lobes truncate, the terminal one much longer and notched at the rounded apex; stamens 4, the glabrous hyaline filaments attached to the tube some distance below the throat; anthers fully 0.5 mm. long, dorsally attached to the filament by a small but very evident pedicel; style glabrous, subulate, its posterior lobe evident; seeds triquetrous, upon a prominent disk, normally 4.

Type specimen 8409, *A. D. E. Elmer*, Baguio, Province of Benguet, Luzon, March, 1907. In damp soil along the Mount Santo Tomas trail at 2250 meters. Associated with but much less common than *Stachys rubisepala, Elm.*

SOLANACEAE

Solanum banahaense n. sp.—A lax shrub, 2 to 4 m. high; bark yellowish gray. Leaves diverse in size, alternate or the uppermost ones opposite and very unequal in size, membranous, glabrous, the larger ones 9 mm. long by 4 mm. wide, oblong or the smaller ones subelliptic, apex acute to acuminate, base obtuse or acute, much paler beneath, the 5 to 7 pairs of nerves arching and united some distance from the margin; petiole 1 cm. long, glabrous. Yellow flowers single or 2 to 3-clustered, chiefly in the axils of leaves or in the axils of their scars, upon very slender 2 cm. long glabrous pedicels; calyx also glabrous, campanulate, 3 mm. deep, 4 mm. wide, leather brown, truncate, 4-nerved; corolla yellow, urn shaped, 1 cm. long, 6 cm. wide across the top; its 4 lobes triangularly obtuse, about 4 mm. long, 3-nerved, pulverulent on the inner surface, the apical tips wrinkled and inflexed; stamens 4, about as many mm. long, included and grown to the corolla tube, their filaments very short or none; style columnar, bearing a small stigma; berry glabrous, yellow.

Type specimen 7492, *A. D. E. Elmer*, Lucban, Province of Tayabas, Luzon, May, 1906. In deep ravines along water courses at 900 meters on Mount Banahao. Rare and related to *S. blumei Nees et Blm.* from which our species is at once distinguished by its 4-merous flowers, truncate calyx and yellow berries.

Solanum lagunense n. sp.—Apparently shrubs; gray twigs finely lenticelled, the younger portion soft rusty pubescent. Leaves alternate, quite variable, slightly inequilateral, lanceolate to oblong or the smaller subelliptic, apex acute to acuminate, base acute and frequently unequally sided, membranous, darker green above, the medium sized blades 16 cm. long by 6 cm. wide, glabrous or the midvein beneath pubescent, with entire margins; nerves 7 to 9 on each side, ascendingly arched, anastomosing at apex, nearly equally prominent on both sides; petiole for the average sized leaf 3 cm. long, slender, ferruginous pubescent or becoming subglabrous with age, deciduous. Inflorescense terminal, or upon short special branchlets or from the leaf axils, in few or several flowered cymes; pedicels recurved, 1 cm. long, slender, densely covered with a rusty brown tomentum; calyx thick, similarly pubescent, 4 mm. long, about as wide across the top, turbinate, margin truncate, with 4 apiculate teeth arising a trifle below the rim, the longest teeth about 1 mm.; corolla 7 mm. long, 4-lobed, united at the base into a short tube, the segments oblong, glabrous except along the upper margin and back of the apex, rather coriaceous, its edges involute and with a thick inflexed apical point, 5 mm. long, obtuse; the 4 filaments broadly winged, 2 mm. long, projected at the apex into short 3-winged lobes; anthers ovately oblong, 2 mm. wide toward the base, 4 mm. long; ovary columnar, 2 mm. long, glabrous; styles 2, straight, 1.5 mm. long, bearing finely sulcate stigmatic portions.

Type specimen 9425, *A. D. E. Elmer*, Los Baños, Province of Laguna, Luzon, April, 1906. It can neither be referred to *S. parasiticum Blm.* nor to *S. blumei Nees* and *Blm.*, and is distinguished from its nearest ally, *banahaense Elm.* by its larger leaves, pubescent flowers and with corolla tube very much shorter.

Solanum retrorsum n. sp.—Shrubby, 1 m. high, rather finely branched; the branchlets when young stellately pubescent but soon turning glabrous brown, densely set with sharp retrorse straw colored 5 mm. long spines. Leaves flat, subglabrous when mature or only the paler green upper surface dotted with ashy gray stellate hairs, alternately scattered along the stems and branches, very variable in size, lanceolate, 9 cm. long by 3 cm. wide, both ends equally acuminate pointed, about 5 to 7-nerved on each side; petioles 1 to 2 cm. long, usually provided with a stellate pubescence. Inflorescence densely clothed with stellate hairs, cymosely paniculate, terminal or lateral, usually those at the former place in flower while the lower ones are in fruit; the fruiting stalk about 3 cm. long and ascending; pedicels comparatively dense pubescent, 3 to 5 mm. long or much longer, recurved; calyx turbinate, leathery, 4 mm. long, the 5 acute or acuminate segments about one half as long, densely pubescent with yellowish gray stellate hairs; petals 5, greenish yellow, rotately spreading or reflexed, about 6 mm. long, 2 mm. wide, oblong to oblanceolate, united into a very short tube, pubescent on the outer side; stamens 5, inserted upon the throat of the corolla and alternating with the segments; filaments glabrous, 1 mm. long, base flattened; anthers basifixed, 3.5 mm. long, truncate at both ends, 1 mm. wide, more or less spreading in anthesis; ovary bubose and glabrous: style columnar and also glabrous; stigma terminal, small and green; berries globose, about 8 mm. in diameter, subtended by the undeveloped calyx segments, of a shining vermillion red when mature.

Type specimen 8719, *A. D. E. Elmer*, Baguio, Province of Benguet, Luzon, March, 1907. It inhabits the hot dry exposed limestone outcroppings and is not at all common. It falls in the section *Leptostemonum* and is distantly related to *S. ferocissimum Lindl.*

GESNERACEAE

Trichosporum crassifolium n. sp.—Epiphytic, upon trees; stems tough, grayish white, slender, terete, subpendulous, glabrous. Leaves very thick, succulent, glabrous, subpendulous, entire margins involute, tips recurved, ovately oblong, opposite, much scattered, the average blades 10 cm. long and 4 cm. wide across the middle or a trifle below this, gradually tapering to an acute or acuminate point, base obtusely rounded, paler green beneath; midvein very evident, the lateral nerves barely visible, subparallel, very much ascending, from 5 to 7 on each side; petiole glabrous, about 1 cm. in length. Flowers mostly solitary, but occasionally 3-clustered from a short common base, from the leaf axils or subterminal; pedicels slender, pulverulent, 12 mm. long, strict, subtended at the base by linearly acute 4 mm. long deciduous bracts; the 5 calyx segments 8 mm. long, lanceolate, acuminate, subglabrous, united at the base; corolla 3 cm. long, nearly straight, sparsely sprinkled with very short hairs, only slightly curved, inflated at the base, averaging about 6 mm. in diameter, rather soft in texture, pink or more yellowish on the interior, nerved; the lobes subequal, averaging 3 mm. long, broadly rounded, the lower lip a trifle longer, the broad upper one bilobed; stamens 4, the 2 pairs subequal in length, equalling the corolla; filaments slender, flexuose, glabrous, inserted upon the corolla throat at about the middle or below this; anthers ellipsoid, 2 mm. long, bilobed at the base, the pairs subunited, 1.25 mm. wide; style glabrous, about 5 mm. long, terminated by a fleshy disc like stigma; ovary stipitate, subcompressed; fruit 15 cm. long or longer, pendulous, the valves persistent, glabrous, brown on the exterior, yellowish on the inner surface; seeds very numerous, linear, brown, 1 mm. long, each end with a 3 mm. long silvery white coma.

Type specimen 9211, *A. D. E. Elmer*, Lucban, Province of Tayabas, May, 1907. Festooning moss covered tree trunks inclining over the Botocan River in deep ravines at 750 meters. Some of the pendulous stems are five meters long. It has also been collected in Mindanao and northern Luzon.

Trichosporum nervosum n. sp.—Numerously branched climbing shrubs, branchlets smooth, yellowish gray, subpendulous. Leaves opposite, subdeflexed, ovate to lanceolate, variable in size, 6 cm. long, 2 cm. wide, smaller when dry, slightly paler green beneath, apex acuminate, base obtuse or rounded, thick and smooth when fresh, becoming strongly nervose beneath when dry; midvein prominent beneath, the 4 to 6 lateral ones subparallel; petiole 5 mm. long, thick, corky; flowers yellowish red, chiefly 3 to 5-clustered at the ends of the twigs or from the upper leaf axils; pedicels slender, glabrous, 6 mm. long; calyx about 4 mm. long, persistent, linearly acuminate, united at the base; corolla 3.5 cm. long, curved, near the base 4 mm. thick, somewhat inflated above the middle, throat oblique; its segments 5, oblong, obtusely rounded, about 5 mm. long, the upper smaller; stamens 5, the subglabrous filaments attached to the middle of the corolla tube, unequal in length; anthers barely protruding, versatile, oblong, 2 mm. long, one half as wide; ovary glabrous, linear, the slender stipe arising from a 1.5 mm. thick caruncle; style pubescent, terminated by a comparatively large discoid stigma; fruits 7 cm. long, linear, with a very slender base, apex sharply pointed.

Type specimen 8607, *A. D. E. Elmer*, Baguio, Province of Benguet, Luzon, March, 1907. Usually found on limestone outcroppings of the pine region. Type material secured one mile west of Baguio. The Igorrotes call it Chila. The characteristic nerved leaves when dry distinguishes it from all other Philippine species.

Dichrotrichum clarkei n. sp.—A succulent epiphyte, suffrutescent; stems few from the same root, sparingly branched, soft, succulent. Leaves chiefly at the ends of the stems and branches, fleshy, subpendulous, densely canescent beneath, strigose above, flat, broadly lanceolate to oblong, greatly varying in size, the upper portion gradually tapering to the acute apex, base rounded or obtuse, margins doubly serrate, the average ones 21 cm. long by 7 cm. wide; the 15 to 19 pinnate nerves ascendingly curved, prominent beneath, more yellowish canescent, the midrib very large comparatively, reticulations few and obscure near the margin only; petiole stout, 3 to 9 cm. long, serecio yellowish pubescent. Infrutescence clustered, axillary, pendulous, the small individual clusters subtended by leathery brown bracts; pedicels usually curved, rigid, pubescent, about 2 cm. long, thickened toward the apex; persistent calyx 8 mm. long, yellowish pubescent, imbricate, unequally 5-segmented; fruit pods averaging 3 dm. long, terete, very short pubescent, linear, tapering somewhat at the base, apex terminated by a sharp point; seeds very numerous, 1 mm. long, 0.25 mm. thick, fusiform, hard, brown; each end provided with fine, crinkled, silvery white, 3 to 5 mm. long appendages.

Type specimen 7499, *A. D. E. Elmer*, Lucban, Province of Tayabas, Luzon, May, 1906. Rare. In humid woods of Mount Banahao at 800 meters. My native employee seemed shy of it on account of stinging hairs, but the ~~another~~ author experienced no ill effect from them. Only one large chocolate brown flower was seen in the field. Named in honor of the late *Mr. C. B. Clarke* of Kew.

Cyrtandra humilis n. sp.—Succulent suberect perennials, varying from 3 to 9 dm. high; stems watery, sparingly branched, the upper portion soft fulvous pubescent, at the base decumbent and suffrutescent. Leaves opposite, 3 to 5 pairs, at the apex of the stems, 1 to 2 cm. apart, coriaceous, spreading, dark green above, much paler beneath, spatulate, 2 to 3 dm. long, 4 cm. wide above the middle, glabrous above, pulverulent beneath except the rusty brown pubescent nerves and reticulations, apex obtuse or rounded, base also rounded or subauriculate, the lower one half with subentire margins, otherwise crenately denticulate; veins 5 to 7 on each side, obscure and soon anastomosing into coarse irregular reticulations which are quite as prominent beneath; petiole stout, densely pubescent with similarly colored hairs, 5 mm. long. Inflorescence clustered in the axils of fallen leaves; peduncles ascending, about equalling the petioles; flowers subtended by dry brown pubescent 15 mm. long bracts, usually 3 to 5-clustered; calyx 15 mm. long, thin, pubescent on the exterior, 4-toothed, the teeth abruptly rolled into an acuminate point, the lower somewhat shorter and narrower; corolla 5 cm. long, pure white except the brown streaked lower surface, subdeflexed, the basal portion constricted, otherwise saccate, soft woolly pubescent, 1 cm. thick above the middle, its segments broadly rounded and rotately spreading; style included, at the thickened base glabrous, otherwise hairy, the upper portion flattened; stigma comparatively very large, expended into flattened divaricate lobes 1.5 mm. long and 1 mm. wide; stamens not seen; fruits terete, apparently straight and suberect, yellowish pulverulent, 1.5 cm. long, about one half as thick, pointed at the apex, rounded at the base; seeds numerous, brown, 0.5 mm. long, oblong, fusiform.

Type specimen 8855, *A. D. E. Elmer*, Baguio, Province of Benguet, Luzon, March, 1907. Quite common on damp ground next to streamlets of heavily wooded ravines near the barrio of Sablan.

Cyrtandra grossedentata n. sp.—Lax shrubs, less than 1 m. high; the white wood breaking with a snap; branches crooked, smooth, grayish white; the young leaf bearing branchlets covered with a dark brown pubescence. Leaves membranous, flat or occasionally with recurved tips, spreading, green and glabrous on the upper surface, especially dark green along the veins, alternate, yellowish white beneath and pubescent but especially dense along the 5 to 7 pairs of ascending nerves and the prominent midrib, averaging 6 cm long and 2 cm. wide above the middle, broadly oblanceolate or oblong to obovate in the smaller ones, grossly dentate especially the upper one half, the teeth terminating by small hairy tufts, base attenuate, apex abruptly acute; petiole 8 mm. long, densely brown pubescent. Infrutescence from the lower leaf axils or more frequently from the axils of the branchlets, pendulous, usually solitary but occasionally in small clusters; pedicel 1 cm. long, slender, densely ferruginous pubescent; immature fruit 3 to 4 mm. long, falcate, terete, 5 mm. thick, subtended at the base by a persistent brown ciliate calyx, only slightly contracted toward the base, apex extended into a slender 1 cm. long beak; flowers not seen.

Type specimen 8864, *A. D. E. Elmer,* Baguio, Province of Benguet, Luzon, March, 1907. It inhabits the banks of damp, much shaded rivulets near Sablan. From *C. incisa Clarke,* its ally, it differs in its much smaller leaves which are not lanceolate and which have much shorter petioles; it also differs from *C. philippinensis Clarke* in essentially the same characters.

Cyrtandra tayabensis n. sp.—Scandent numerously branched shrub; the branchlets slender, subdeflexed, yellowish brown, quite succulent. Leaves also succulent, heavy, deep green above, much paler beneath, opposite, only toward the ends of the sparsely strigose twigs, glabrous except the ferruginous nerves beneath, broadly oblanceolate but occasionally the smaller ones lanceolate, margins entire or crenately apiculate, the larger blades 18 cm. long, 6 cm. wide above the middle, acute at apex, the base gradually tapering or slenderly cuneate; petioles 3 to 7 cm. long, ferruginously pubescent when young; nerves strongly ascending, 9 to 12 on each side of the prominent midrib, obscurely united beneath the margin, reticulations coarse and faint. Inflorescence chiefly clustered in the axils of the fallen leaves, 1 to 3 creamy white flowers from each axil; pedicels less than 1 cm. long, rusty brown pilose, subtended at the base by a dense whorl of subpersistent, nearly glabrous, brown colored, very unequal involucral bracts which are more or less united at the base and about 1 cm. in length; calyx saccate, 12 mm. long, brown when dry, subglabrous, irregularly split from the apex into 5 segments; corolla tube 2 cm. long, more or less constricted one third from the base, slightly curved, strongly nerved, sparsely pilose on the exterior, subcampanulate toward the apex, the 5 segments about 4 mm. long, reflexed, obtusely rounded at the apex, 2 mm. wide; stamens 2, within the corolla tube; free filament 4 mm. long, looped, glabrous, otherwise adnate to the tube; anther nearly 3 mm. long, one half as wide across the sagittate base, oblong, basifixed; ovary subcompressed, linear oblong, pilose, upon a carunculate base, about 6 mm. long, gradually tapering into the equally long style which bears a clavate stigma.

Type specimen 9238, *A. D. E. Elmer*, Lucban, Province of Tayabas, Luzon, May 1907. Discovered in humid woods at Bukal, a small barrio between Lucban and Sampaloc. Related and indeed very similar to a specimen in the herbarium of the Bureau of Science, collected by *Mr. M. L. Merritt* on Mount Halcon, Mindoro, June, 1906. Our specimen has shorter petioles; longer, curved, and pubescent corollas; and with larger calyces and usually pilose ovaries.

ACANTHACEAE.

Hemigraphis setosa n. sp.—Erect, herbaceous perennial 3 to 5 dm. high; stems solitary or several from the same cluster of fibrous roots, nodulose, more or less angled, puberulous, usually branched above the middle. Leaves mostly cauline and more numerous on the branches, opposite, smooth but strigosely marked on both sides, duller and paler green beneath, diverse in size and shape, linearly oblong to narrowly elliptic, the normal ones 7 cm. long by 2.5 cm. wide, edges subentire toward the base, obscurely crenate toward the apex, subinvolute, apex obtuse, base cuneate; petiole about 5 mm. long, strigose; nerves about 6, 3 on each side, ascendingly curved, more prominent beneath, short strigosely pubescent. Inflorescence terminal, 4 to 6 cm. long, erect; peduncles usually 3, from 1 to 2 cm. long, subtended by a pair of much elongated foliaceous bracts, strigose; flowers sessile, pink, opposite, each subtended by a single linear 13 mm. long foliaceous bract; calyx persistent, green, strict, united at the base, ciliate, 1 mm. wide at most, setosely acuminate, 4, with a prominent midrib; corolla 1 cm. long, the basal one third abruptly constricted, the upper portion inflated, glabrous except the finely ciliate margins toward the top; lobes 4, about 2 mm. long, oblong to subelliptic, obtusely rounded at apex; stamens 4, two of the longer ones equalling the corolla segments, the shorter pair included; filaments inserted upon the inflated constricted corolla throat, the upper free portion glabrous, the adnate portion ciliate; anthers dorsally attached below the middle, introrse, longitudinally dehiscing, flattened, 2 mm. long, 1-celled; ovary oblong, 2 mm. long, 1 mm. wide, finely pubescent at the conical apex; style very slender, subglabrous; capsule 1 cm. long, smooth, straw brown, longitudinally ridged, loculicidally dehiscent, the valves divergent, 1 mm. thick, sharply pointed; seeds about 10, arranged on each side of the dissepiment, strongly flattened, slightly pulverulent, of the same color, suborbicular, 1 mm. in diameter, inserted in the axil of a short stout spinescent raphe.

Type specimen 7248; *A. D. E. Elmer*, Palo, Province of Leyte, Leyte, January, 1906. In deep fertile soil of light woods. Related to *H. hirsuta T. Andr.*, but much less hirsute and with bracts subtending the flowers very linear and not dissimilar to the calyx segments.

Justicia spiciformis n. sp.—An erect or suberect suffrutescent perennial; stems 5 to 8 dm. high, subterete, puberulous, nodulose, more or less crooked, branched above the middle, its roots comparatively few, thick and wiry. Leaves opposite, membranous, unequal in size and shape, the normal blades 12 cm. long, 4 cm. wide across the middle, equally tapering toward both ends, acute to obtuse at the apex, base cuneate, margins subentire or crenately toothed, bright green above, yellowish green beneath, flat; petiole slender, 3 cm. long, puberulent; lateral nerves oblique, pulverulently brown beneath, 5 to 7 on each side, reticulations faint. Inflorescence terminating the stems and branches, 8 cm. long, sparingly branched from the base only, set upon 3 to 5 cm. long puberulent peduncles; flowers creamy white, sessile, secundly arranged, bract opposed, rather evenly scattered along the glabrous rachis, subtended by a whorl of 3 glabrous acuminate 2 mm. long bracts, calyx 4 mm. long, glabrous, the 5 strict segments setaceously acuminate, the basal one third united; corolla 9 mm. long, glabrous, tubular about one half its length, 2-lipped; the upper lip entire, broadly acuminate, 4 mm. long; lower lip about as long, 3-lobed and usually with recurved tips, the middle lobe a trifle longer; stamens 2, fertile, attached to the inner sides of the corolla; filaments flattened, hairy one half way down, the free portion glabrous, darker brown and usually twisted; anthers nearly parallel, equalling the corolla segments, elongated, 3 mm. long, basifixed, 2-lobed at base, introrse, longitudinally dehiscent, 2-celled; style very slender, glabrous, shorter than the stamens; ovary elongated, brown, glabrous, 2 mm. in length; capsule 1.5 cm. long smooth, straw brown, longitudinally grooved, 1.5 mm. thick, loculicidally dehiscing from the apex, the valves strongly divergent; seeds about 12, alternatingly attached to both sides of the dissepiment, each subtended by a single stout recurved spinescent raphe, much flattened, subrotund, 1.25 mm. across.

Type specimen 7347, *A. D. E. Elmer*, Palo, Province of Leyte, Leyte, January, 1906. In rich soil of woodlands and associated with *Hemigraphis setosa Elm.*

RUBIACEAE

Uncaria clavisepala n. sp. –Apparently a sprawling shrub; twigs umber brown, puberulous or short pubescent, more or less angled, slender. Leaves opposite, distichous, 3 cm. apart, flat, oblong to subelliptic or obovate, 10 cm. long by 4 cm. wide, entire, yellowish pale beneath, glabrous, subglabrous or very finely pubescent beneath, apex acute to acuminate, base rounded; petiole about 9 mm. long, brown puberulous; nerves 5 to 7 pairs, much ascending, prominent beneath, with very obscure reticulations. Inflorescence from the upper leaf axils, capitate, numerously flowered, 2 to 3 cm. in diameter; its peduncle about 4 cm. long, stout, rigid, flattened, thickened toward the base, short chocolate brown pubescent, each subtended by oblong caducous 5 mm. long bracts, articulate and subtended by a similar whorl of bracts just above the middle; receptacle hairy; pedicels 3 to 4 mm. long, yellowish pubescent, slender, straight; calyx 4 mm. long, similarly pubescent; its 5 segments 2 mm. long, subclavate; corolla 12 mm. long, its 9 mm. long slender tube pubescent, its 4 oblong 1.75 mm. long segments pubescent on the dorsal side; anthers subsessile, upon the throat of the corolla and alternating with its segments, 1.5 mm. long, broadly linear, finely bidentate at the base; styles slender, glabrous, exceeding the corolla by 5 mm., the terminal thickened portion recurved and terminated by a subclavate stigma; fruits not seen.

Type specimen 8262, *A. D. E. Elmer*, Los Baños, Province of Laguna, Luzon, April, 1906.

Ophiorrhiza involucrata n. sp.—Succulent herbs 3 to 5 dm. high; perennial stems and branches smooth, glabrous or the younger portions with reddish brown hairs, curved, twisted and rather crookedly rebranched. Leaves soft, thin, dark green above, paler beneath, obliquely oblong, exceedingly unequal in size, the smaller ones ovate, all acute, the base of the larger ones obliquely subcuneate or subtruncate, the larger blade 8 cm. long by one half as wide across middle, the large leaf opposed by a small one, glabrous, entire; the petiole of the large leaves slender, subglabrous, yellowish when dry, 2 to 5 cm. in length; the small leaves only 5 mm. long; nerves of the larger blades 9 to 13 on a side, equally prominent on both sides, dirty yellowish brown especially beneath, ascendingly curved, tips anastomosing, reticulations very prominent or almost ridged on the upper surface; stipules subpersistent, 5 to 8 mm. long, laciniate. Inflorescence terminal or from the upper leaf axils, in a more or less congested cyme 2 cm. across; peduncle strict, slender, subglabrous, 2 to 3 cm. in length; the short branches of the cyme subtended by thin nerved foliaceous bracts which in the fresh state are strongly incurved over the flowers and are of a characteristic sulphur green on the under side; pedicels 3 mm. long at most, more or less angularly winged, glabrous; the 2 winged capsule 8 mm. wide, 3 mm. high, glabrous, apex shallowly curved; the sides divaricately ascending, truncately rounded at the ends, 2 mm. wide, dehiscing along the entire length of the apical side; seeds very numerous, smooth, brown, quadrangular, not more than 0.5 mm. thick.

Type specimen 7603, *A. D. E. Elmer*, Lucban, Province of Tayabas, Luzon, May, 1907. It was discovered in very loose gravelly soil of a damp stream bank in a deep wooded ravine at 750 meters on Mount Banahao. Forms dense patches with its subdecumbent crookedly rebranched stems and branches. Not observed elsewhere.

Randia rigidaefolia n. sp.—Scandent upon small tree trunks to which the 15 mm. thick stems cleave rather tightly; branches greenish, divaricate or subpendulous, sparingly rebranched. Leaves thick, opposite, scattered, rigid, flat, shining on both sides, dull deep green above, olive green beneath, elliptic but with an acute apex and obtuse base, 12 cm. long. 6 cm. wide across the middle, glabrous, margins entire and subinvolute; petiole 2 to 3 cm. long, glabrous; stipule simply a callous rim; nerves pinnate, more conspicuous beneath, usually 7 to 9 on each side, faintly united 1 to 2 mm. beneath the margin, reticulations coarse and obscure. Inflorescence ternately paniculate, terminal, mostly 3 pedunculate from the base, the glabrous peduncle about 6 cm. long, the secondary peduncles one half as long, all the branches and even the short yellowish puberulent pedicels subtended by broad leathery sharply pointed bracts; flowers young but apparently early falling, perfect; calyx glabrous, 2 to 3 mm. long, turbinate 1.5 mm. long across the top, its rim shallow and with 5 minute apiculate teeth; corolla short tubular, clavately elongated in the bud state, finally at least 9 mm. long, glabrous, deciduous as a whole; the 5 segments straight, valvate in bud, recurved and rotate when in anthesis, thick, about as long as the tube, densely hairy in the region of the throat, obtuse, ligulate, with callous incurved tips; stamens 5, included, alternating with the segments and inserted upon the throat: filaments glabrous, 1.5 to 2 mm. long, rather slender; anthers linear, 2 mm. in length, dorsally attached below the middle, bifid at the base, glabrous; style slender, also glabrous, 2-cleft, ultimately exceeding the stamens.

Type specimen 9118, *E. D. E. Elmer*, Lucban, Province of Tayabas, Luzon, May, 1907. In humid forests on the road between Lucban and Sampaloc. The above description applies very closely to *Psychotria* as well as to *Randia*. Not having mature fruits there remains some doubt as to its proper genus. Still, the more or less numerous ovules places it with the latter genus; the scandent habit, terminal inflorescence and coriaceous leaves are characters of either genera.

Psychotria acuminatissima n. sp.—Slender shrub, 2 m. high, with branches rather crooked and gnarly near the top; wood easily breaking; bark yellowish brown. Leaves ascending, darker green above, nearly flat, submembranous, linear lanceolate to oblanceolate, very variable in size, the larger ones 13 cm. long, and 2 cm. wide, very acuminate, base narrowly attenuate, glabrous; lateral nerves faint, from 9 to 13 on each side, ascending; petiole glabrous, 3 to 10 mm. long; stipules brown, fimbriate, about 1 mm. wide, decidudous. Flowers not seen; infrutescence terminal, much exceeded by the terminal leaves, 2 cm. long, at least that in width; peduncles 3 to 5, about 1 cm. long, glabrous, somewhat flattened; pedicels shorter, usually 3 from each peduncle, subtended by membranous brown bracts; drupe 7 mm. across the top, subcompresed, obovoid, base gradually tapering, about 7 mm. long, smooth, only the sides with a single crease, 2-celled, beginning to turn yellow from the base; pyrene 1 in each cell, the dorsal convex side nearly orbicular, the other side flat, 4 mm. across, attached by the base, black.

Type specimen 8752, *A. D. E. Elmer*, Baguio, Province of Benguet, Luzon, March, 1907. Not common in limestone shrubbery below the barrio of Autop. Differs from my *P. subalpina* in its narrower and longer acuminate leaves, drupes not sessile and the stones not ridged.

Psychotria pilosella n. sp.—A 1 to 2 m. high shrub, its sparse branches rigid and crooked; wood moderately soft, closely grained, yellowish white; bark quite thick, smooth, green when young, dark brown or nearly black when old. Leaves soft pilose with olivaceous colored hairs on both sides, flat, spreading horizontally and radially, oppositely arranged toward the ends of the twigs, obovate to oblanceolate, membranous, quite variable in size, the average ones 15 cm. long, 4.5 cm. wide above the middle, apex abruptly acute, the basal two thirds gradually tapering to an attenuate base; petiole densely pilose with similarly colored hairs, 1 to 2 cm. long; stipule brown, 6 mm. long, rather broad at the base, glabrous on the inner surface, caducous; nerves conspicuous beneath, subparallel, 9 to 13 on each side, very oblique, obscurely arched and united near the margin, reticulation obscure. Infrutescence terminal, 2 to 5 cm. long, peduncles strict, 2 to 3 from the base. the central one usually a trifle longer and straight, the two lateral ones divaricate, its pubescence similar to that on the petioles; fruits 1 to 3-clustered in a single terminal subwhorl or occasionally with an additional cluster beneath the terminal one, sessile, ellipsoid or obovoid, the basal portion constricted iuto a 1 to 3 mm. long pedicel like stalk, 1 to 1.5 cm. long, 7.5 mm. thick toward the apex, glabrous, green when collected; young pyrenes broadly obovoid, the apex subtruncate, the edges rather prominent, the ventral surface nearly plane, the dorsal concave and almost without ridge, attached at the sharply pointed base; flowers not seen.

Type specimen 9213, *A. D. E. Elmer* Lucban, Province Tayabas, Luzon, May, 1907. This small undershrub inhabiting a deep wooded ravine at the foot of a precipice at 850 meters on Mount Banahao is very rare and should not be confused with *P. crispipila Merr.* which aside from fruit characters has thicker, more attenuate leaves which are pubescent on the lower surface only and have thicker and more prominent nerves.

Pyschotria tayabensis n. sp.—A low 2 to 3 m. high crookedly and laxly branched shrub; wood hard, dull or reddish white, with thin and yellowish brown bark. Leaves submembranous, flat, dark green above, much paler beneath, drying to a badius brown, rather numerous toward the ends of the short ultimate branchlets, lanceolate to oblanceolate, quite variable in size, the medium sized blades 9 cm. long, 2.5 cm. wide across the middle, acute at both ends, frequently curved and somewhat inequilateral, glabrous except the reddish brown scabrous hairs along the nerves, entire margins;

nerves pinnate, 9 to 13 pairs, curvingly ascending, conspicuous beneath, their ends arched and connected, reticulations obscure; petiolea bout 1 cm. in length, pilose or when old subglabrous; stipule caducous, brown, 5 mm. long, finely pointed. sparsely hairy. Young inflorescence surrounded by broad bracts which soon fall; the inflorescence when in anthesis occasionally subtended by persistent foliaceous bracts, terminal, sessile, capitate, 1 cm. in diameter; flowers whitish, somewhat fleshy, sessile, about 10–clustered; calyx 3 mm. long, glabrous, the basal 1.5 mm. pedicellate, 2 mm. wide across the top, terminated into 5 setaceously pointed teeth about 1 mm. in length; corolla tube 3 mm. long, the 5 ultimately reflexed lobes 2 mm. long by 1 mm. wide, pubescent only at the throat; stamens of an equal number; filaments 0.5 mm. long, glabrous, inserted upon the throat and alternating with the segments; anthers basifixed, oblong, 0.75 mm. long; style 3 to 4 mm. in length, glabrous, gradually thickened and subcompressed toward the apex, the tip cleft into 2 unequal arms; ovary glabrous; drupes subglobose or obovoid, 5 mm. thick, smooth, turning purplish, sessile or short pedicellate; pyrenes circular, plano-convex. the dorsal side smooth, attached near the base on the ventral side.

Type specimen 7581, *A. D. E. Elmer*, Lucban, Province of Tayabas, Luzon, May, 1907. An undershrub of rather dry woods on Mount Banahao at 750 meters. This species has strong affinities to *P. longipedicellata Elm.* and *P. bataanensis Elm.* but is sufficiently distinct from either.

Psychotria ramosissima n. sp.—A climbing and profusely sprawling shrub; branches 1 cm. thick, slender, the leaf bearing portion greenish and usually drooping when free from its support; stems about 5 cm. thick, soft and flexible, covered with brown lenticelled bark. Leaves conduplicate on the upper surface, slightly recurved towards the apex, leathery, lucid green above, paler beneath, glabrous except the sparsely pilose nerves underneath, the medium sized blades 14 cm. long and 5 cm. wide at or below the middle, oblong, equally tapering at both ends, apex acute, base obtuse, edges entire; nerves more prominent beneath, oblique, parallel, 7 to 9 pairs, the the cross bars few and very faint; petiole glabrous, 2 cm. long, deciduous; stipules thin, brown, glabrous, caducous, 6 mm. high, very broad or forming a loose rim. Inflorescence terminal, 3 to 6 dm. long and correspondingly wide, broadly cymosely paniculate, several branched from the base, occasionally subtended by foliaceous bracts; branches and branchlets in 3's, subtended by short brown more or less fringed bracts; flowers light cream color, also in 3's strongly and sweetly fragrant, pedicels strict, 1 to 3 to 5 mm. long, glabrous, subtended by apiculate bracts; calyx very short, flattened, with 4 apiculate teeth; corolla tube 2 mm. long, glabrous on the exterior, with long yellowish hairs near or at the throat; the 4 oblong segments equal in length, obtuse at the apex, glabrous on both sides, 1.25 mm. wide, reflexed in anthesis; stamens filiform, glabrous, about 3 mm. long, adnate to the throat of the corolla and alternating with its segments; anthers ellipsoid, curved, 0.5 mm. long; style at least 2 mm. in length, glabrous or with a few scattered long hairs, bifid or cleft at apex; ovary subglabrous, subglobose, 0.75 mm. thick.

Type specimen 9178, *A. D. E. Elmer*, Lucban, Province of Tayabas, Luzon, May, 1907. In dense shrubberies along rivulets of low gulches at 600 meters. Its numerous branches form widely sprawling masses over the tops of shrubs and small trees. When in full flower it can be seen a long distance as a mass of white and the strong odor is most pleasing.

Psychotria loheri n. sp.—Shrub 4 m. high, widely and numerously branched toward the top, wood soft; bark grayish; branchlets brown, glabrous. Leaves chiefly at the ends of the twigs, much varying in size, the normal ones 6 cm. long, 2 cm. wide across the middle, lanceolate to oblong or subelliptic, more or less abruptly but equally tapering towards both ends, acute apex obtusely pointed, base attenuate, submembranous, dull dark green above, paler beneath, pinnately nerved with 9 to 13 pairs; petiole 5 mm. long, glabrous; stipule a very narrow brown rim. Infrutescence terminal; peduncles 1 to 2 cm. long, slender, glabrous, usually 3, the central one longer; pedicels 3 to 5 mm. long or almost none, persistent; drupes subsessilly clustered or short pedicellate, 7 mm. long, obovoid, 5.5 mm. in diameter above the middle, yellowish but soon turning to coal black, smooth, more or less grooved on the sides; calyx persistent on the fruit as a truncate rim; pyrene 4 mm. across, the nearly flat surface orbicular, other side roundly concave, black; flowers not seen.

Type specimen 8584, *A. D. E. Elmer*, Baguio, Province of Benguet, Luzon, March, 1907. Rare, and only observed in oak woods on Mount Santo Tomas at 2500 meters. It has some affinities to my *P. subalpina*, but with smaller leaves and smooth pyrenes. The leaf characters distinguish it at once from *P. acuminatissima Elm.* Named after *Mr. A. Loher.*

Wendlandia membranifolia n. sp.—A shrub 3 m. high, with closely grained reddish wood and longitudinally checked bark; branches spreading above the middle, rather short and crooked, the ultimate twigs reddish brown pubescent. Stipule persistent, orbicular, 1 cm. across, strigose; petiole 1 to 2 cm. long, pubescent, blade 18 cm. long, 11 cm. wide, usually elliptic or broadly oblong to obovate, apex obtuse or acute, base short attenuate or acute, membranous, subglabrous on the upper surface except along the nerves, soft pubescent beneath; nerves pinnatiform, 7 to 11 pairs, very prominent beneath and densely soft pubescent. Panicle terminal or subterminal, numerously branched and widely spreading, 1 to 3 dm. long and almost that across, reddish brown pubescent, the branches divaricate, subtended by bracts; flowers tubular, white, more or less clustered in small groups, much spreading; calyx 1.5 mm. long, 1 mm. in diameter, urn shaped, obscurely 5-toothed, sparsely ciliate pubescent; corolla 6 mm. long, gradually thickened toward the top, pubescent on the interior; the 5 segments a trifle longer than 1 mm., oblong or subelliptic, apex rounded, strongly reflexed, glabrous; filaments glabrous, 1 mm. long, alternating with the corolla segments and inserted upon the throat; anther versatile, oblong, as long as the filament; style slender, glabrous; stigma bilobed into rather broad fleshy lobes.

Type specimen 8946, *A. D. E. Elmer*, Baguio, Province of Benguet, Luzon, March, 1907. Quite common but only found on hot lightly wooded ravines two miles south of Sablan. It differs from *W. luzoniensis DC.* in the large obovate soft membranous leaves which are not acuminate, and in the more pubescent stipules, leaves, branchlets and panicles.

COMPOSITAE.

Pluchea incisa n. sp.—A straggling or subscandent perennial; branches widely spreading. Leaves subsessile, usually in small clusters along the ultimate twigs, with 3 to 5 faint nerves, very unequal in size, the larger ones 8 cm. long, 2.5 cm. wide, the smallest bract like, submembranous, slightly scabrous on both sides and more or less hairy especially the nerves; margins subentire, apiculate, dentate and in the normal blades incised; twigs terminated by spicate or subpaniculate racemes, from 1 to 3 dm. long, 3 to 7 cm. across; peduncles and 3 to 5 mm. long pedicels pubescent, subtended by most variable bracts; heads campanulate, 1 cm. long, at least that across when in anthesis, subsessile but usually pedicellate; involucre imbricate, dirty pubescent, the basal bracts short and broad, the inner ones linear and thinner; immature achene columnar, 1 mm. long, strigose; pappus whitish, bristle like, slightly scabrous, unequal, 6 mm. long; the yellow tubular corolla slightly longer, glabrous, the upper one third somewhat inflated, terminating into 5 short obtuse teeth; filaments slender, free, glabrous; united anthers a trifle exceeding the corolla segments, light lemon color, the upper one half broadest, tips obtuse, base with fine bristle like appendages, 3 mm. long; style glabrous; stigma divided into 2 ligulate lobes, exerted.

Type specimen 8396, *A. D. E. Elmer*, Baguio, Province of Benguet, Luzon, March, 1907. This was only once or twice seen in a jungle on Mount Santo Tomas at 2500 meters. According to *de Candolle's* Prodomus it belongs to section *Hebephora* a small group of doubtful relation to *Pluchea* and *Blumea*. Its nearest ally is *P. scabrida DC.* from which our specimen can be recognized by the incised, more pubescent leaves.

Blumea copelandii n. sp.—Biennial herbs, 3 to 5 dm. high; stems solitary or sometimes 2 or 3 from the same root, unbranched except toward the inflorescence, soft pubescent, with scattered leaves. Leaves chiefly radical, mostly spreading, the larger ones 6 cm. long, almost 2 cm. wide, the blade proper oblong or subelliptic, regularly dentate, rounded at apex, base extended into a slender decurrent petiole, membranous, soft pubescent on both sides, the faint nerves much ascending or subparallel; the cauline leaves smaller and becoming bract like, narrower, but with broader subclasping cordate or auriculate bases. Inflorescence in terminal glomerate heads, usually upon slender 1 to 3-branched and flexuose peduncles; pedicels very unequal in length, as long as 1 cm., slender, densely pubescent, subtended by linear similarly pubescent bracts; flowers subpendulous, rayless, 7 mm. high, somewhat broader; involucral bracts unequal, linear, quite thin, pubescent, with purplish tips; disk corollas light yellow especially toward the apex, tubular and gradually expanding toward the apex, glabrous, 4 mm. long, terminated by 5 acute teeth; pappus copius, nearly as long, finely scabrous, soft dull white; filaments very slender, glabrous; anthers 1 mm. long, linear, with acuminate apices, base abrupt with minute appendages; stigma clavate, divided into 2 obtuse lobes, protruded; achene much flattened, 1 mm. long, one half as wide, oblong or broadest above the middle, straw colored, pulverulent, only the edges with conspicuous thickenings.

Type specimen 8400, *A. D. E. Elmer*, Baguio, Province of Benguet, Luzon, March, 1907. On north gravelly steep slopes of Mount Santo Tomas at 2250 meters. I take pleasure in naming this distinct species after *Dr. E. B. Copeland.*

ERRATA

P. 7, ll. 10 and 12 from bottom, for "medium" read "median"
P. 7, l. 6 from bottom, for "Well." read "Wall."
P. 8, l. 6 from top, for "G." read "I."
P. 9, l. 9 from top, for "779" read "789"
P. 9, l. 5 from bottom, for "Lond." read "Loud."
P. 16, l. 2 from bottom, for "138" read "6138"
P. 16, l. 8 from top, for "philippinenses" read "philippinensis"
P. 17, l. 4 from top, place "Hedyotis prainiana King" immediately after "O. prainiana (King) Elm."
P. 20, l. 11 from top, place "Hedyotis lineata Roxb." immediately after "O. lineata (Roxb.) Elm."
P. 21, l. 9 from top, place "Hedyotis tenelliflora Blm." immediately after "O. tenelliflora (Blm.) Elm."
P. 22, l. 17 from bottom, for "philippinenses," read "philippinensis"
P. 28, l. 1 from top, for "pedunculare" read peduncularis"
P. 28, l. 1 from top, place "Canthium pedunculare Cav." immediately after "P. peduncularis (Cav.) Elm."
P. 28, l. 4 from top, place "Canthium horridum Blm." immediately after "P. horrida (Blm.) Elm."
P. 28, l. 9 from top, place "Canthium lycioides Rich." immediately after "P. lycioides (Rich.) Elm."
P. 28, l. 15 from top, place "Canthium villarii Vid." immediately after "P. villarii (Vid.) Elm."
P. 28, l. 17 from top, for "mite" read "mites"
P. 28, l. 17 from top, place "Canthium mite Bartl." immediately after "P. mitis (Bartl.) Elm."
P. 28, l. 20 from top, for "(Roxb.)" read "(Gaert.)"
P. 28, l. 20 from top, place "Canthium didyma Gaert." immediately after "P. didyma (Gaert.) Elm."
P. 28, l. 22 from top, place "Canthium arboreum Vid." immediately after "P. arborea (Vid.) Elm."
P. 33, l. 1 from bottom, place "Tarenna incerta K. et V." immediately after "S. incerta (K. et V.) Elm."
P. 33, l. 7 from bottom, for "pubescent" read "pubescens"
P. 33, l. 13 from bottom, for "Stlyocoryne" read "Stylocoryne"

P. 35, l. 10 from top, eliminate "and 2805"

P. 36, l. 7 from bottom, for "J." read "T."

P. 39, l. 1 from top, for "Urophyullm" read "Urophyllum"

Change pages of Art. 2 from 1 to 21, inclusive, to 42 to 62.

P. 43, l. 12 from top, for "Peseudo-hermaphrodite" read "Pseudo-hermaphrodite"

P. 49, l. 3 from top, for "Linneus" read "Linnaeus"

P. 53, l. 12 from bottom, for "8029" read "8029a"

P. 58, l. 7 from bottom, for "repandifolius" read "repandifolia"

P. 59, l. 2 from bottom, for "8023" read "8023a"

P. 63, l. 1 from top, for "quadripetiolata" read "quadripetala"

P. 65, l. 8 from bottom, for "paloense" read "paloensis"

P. 70, l. 6 from bottom, for "7959" read "7616"

P. 76, l. 9 from top, for "polycephyllus" read "polycephalus"

P. 78, l. 8 from bottom, for "7174" read "7174a"

Pages "78" and "79" of Art. 6 change to "78a" and "79a"

P. 80, l. 8 from bottom, for "integrifolius" read "integrifolia"

P. 86, l. 1 from bottom, for "Elephantophus" read "Elephantopus"

P. 94, l. 1 from top, for "V. vialis DC. Prod. 5;25, 1826. Miq. Fl. Ind. Bat. 2;12, 1856." read "Vernonia benguetensis n. sp." and after the description add "Type specimen 6584, A. D. E. Elmer, Baguio, Province of Benguet, Luzon, June, 1904."

P. 95, l. 5 from bottom, for "Elephantophus, read" Elephantopus"

P. 99, l. 5 from top, for "viscosa" read "viscosum"

P. 101, l. 16 from top, for "A." read "E."

P. 104, l. 10 from bottom, for "Inuloideae" read "Inuleae"

P. 121, l. 19 from top, for "oblancifolia" read "oblancifolium"

P. 123, l. 13 from bottom, for "6586" read "6556"

P. 124, l. 1 from top, for "stacnelina" read "stachelina"

P. 124, l. 1 from top, for "dichotemum" read "dichotomum"

P. 127, l. 15 from top, for "1856" read "1836"

P. 137, l. 6 from top, for "Klennia" read "Kleinia"

P. 148, l. 5 from top, for "E. humifusa DC. Prod. 6; 302, 1837." read "Emilia marivelense n. sp." and after the description add "Type specimen 3282, E. D. Merrill, Mount Mariveles, Province of Bataan, Luzon, October, 1903."

P. 151, l. 5 from bottom, for "benguetense" read "benguetensis"

P. 152, l. 8 from top, for "benguetense" read "benguetensis"

P. 157, l. 2 from top, for "Miq." read "DC."

P. 184, l. 11 from bottom, for "(DC.)" read "(Linn.)"

P. 191, l. 6 from bottom, for "7182" read "7182a"

P. 192, l. 15 from bottom, for "manilense" read "manilensis"

P. 194, l. 13 from top, for "leytense" read "leytensis"

P. 198, l. 17 from bottom, for "7188" read "7166"

P. 202, l. 19 from top, for "paloense" read "paloensis"

P. 202, l. 15 from bottom, for "dm." read "cm."

P. 203, l. 17 from top, for "paloense" read "paloensis"

P. 206, l. 1 from top, for "Trigonostemum" read "Trigonostemon"

P. 205, l. 13 from bottom, for "7178" read "7176"

P. 213, l. 22 from bottom, for "F. confusa n. sp." read "F. villarii n. sp."

P. 214, l. 9 from bottom, for "7849" read "7847"

P. 214, l. 9 from top, for "F. hemsleyi n. sp." read "F. rigida n. sp." and in line 6 from bottom strike out "Named in honor of Dr. W. Bottling Hemsley."

P. 215, following note of F. dilatata Merr. add "Type specimen collected by F. W. Foxworthy, Province of Rizal, Luzon, January, 1906 (Bureau of Science record 99)".

P. 216, following note of F. palawanensis Merr. add "Type specimen collected by F. W. Foxworthy on Victoria Peak, Island of Palawan, March to April, 1906 (Bureau of Science record 706)".

P. 223, l. 1 from top, for "Cynometra alternifolia n. sp." read "Hardwickia alternifolia n. sp."

P. 225, l. 18 from bottom, for "Dumbaria" read "Dunbaria"

P. 226, l. 20 from bottom, for "Caesalpinia benguetensis n. sp." read "Mezoneurum benguetense n. sp."

P. 233, l. 4 from bottom, for "Enumeratis" read "Enumeratio"

P. 233, l. 7 from bottom, for "S. N." read "s. n."
P. 233, l. 10 from bottom, for "quaque" read "quaeque"
P. 233, l. 18 from bottom, for "rhadibus" read "rhachibus"
P. 235, l. 9 from top, for "max" and "glaberrinia" read "mox" and "glaberrima"
P. 235, l. 9 from top, for "secoper visibilibus" read "seco pervisibilibus"
P. 235, l. 19 from bottom, for "vidatur" read "videtur"
P. 235, l. 15 from bottom, for "pubecentibus" read "pubescentibus"
P. 235, l. 14 from bottom, for "deltoideis" read "deltoidea"
P. 235, l. 7 from bottom, for "dryopteroides," "sinn" and "asplenioides" read "dryopteroidea," "sinu" and "asplenioidea"
P. 235, l. 14 from top, for "S. cumingii (Tec.) Moore" read "E. cumingii (Fée) Moore"
P. 243, l. 8 from bottom, eliminate "and 3022"
P. 244, l. 8 from top, for "7739" read "7730"
P. 257, l. 6 from top, for "7710" read "7701"
P. 263, l. 17 from top, for "two" read "one"
P. 264, l. 10 from bottom, for "Favulus" read "Favolus"
P. 264, l. 17 from bottom, for "Hexagoua" read "Hexagona"
P. 277, place "Kadsura philippinensis n. sp." under "Magnoliaceae"
P. 303, l. 8 from bottom, for "C." read "G."
P. 310, l. 17 from bottom, for "Croton curtiflorus n. sp." read "Sycopsis philippinensis Hemsl."
P. 323, l. 16 from bottom, for "Eurya myrtilloides n. sp." read "Ilex luzonica Rolfe."
P. 331, l. 10 from bottom, for "Anthrophyllum" read "Arthrophyllum"
P. 342, l. 18 from top, for "banahaense Elm." read "S. banahaense Elm."

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